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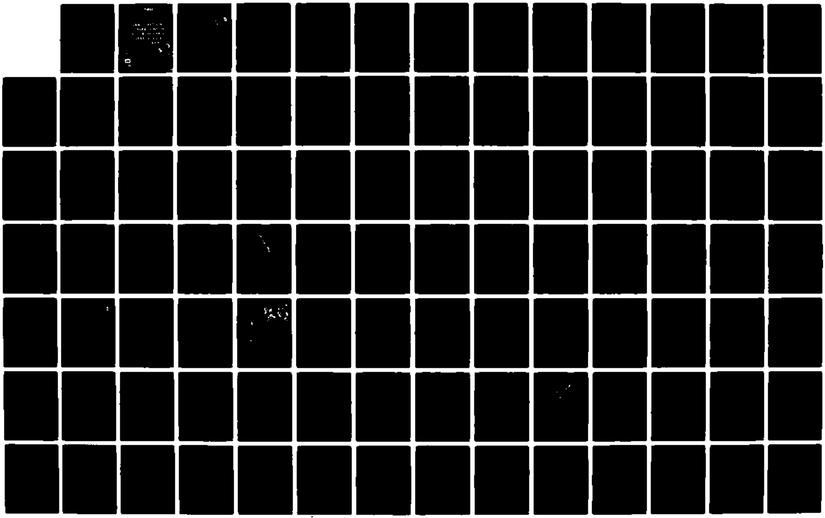

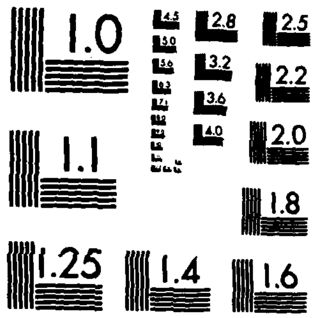
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FINAL

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ENVIRONMENTAL IMPACT STATEMENT

SAND DREDGING OPERATIONS IN LAFOURCHE PARISH, NEAR LEEVILLE, LOUISIANA

DTIC FILE COPY

APRIL 1982

US Army Corps
of Engineers
New Orleans District

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COVER SHEET

Lead Agency: US Army Corps of Engineers
New Orleans District
New Orleans, Louisiana

Title: Sand Dredging Operations in Lafourche Parish, Near Leeville, Louisiana

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Final Environmental Impact Statement

In the general area of Terrebonne and Lafourche Parishes, and Grand Isle, Louisiana, sand for fill is obtained from small existing sand pits and/or the Mississippi River. The Plaisance interests and the Picciola interests, in separate applications, applied for permits pursuant to Section 10 of the River and Harbor Act of 1899 and Section 404 of the Clean Water Act to dredge sand from wetlands of lower Lafourche Parish and perform associated fill operations for levees, dikes, etc. The proposed sand mining would result in the destruction of 180 acres of brackish marsh and areas of shallow open water. Alternatives to the proposed works include use of existing pits, use of Mississippi River sand, and mining of the chenier ridges between Leeville and Grand Isle, Louisiana. Some mitigation measures have been agreed to by the applicants and other measures may be considered by the applicants.

Send your comments to the District Engineer by

SUMMARY

Introduction

Three applications were submitted to New Orleans District, US Army Corps of Engineers by two separate applicants, Mr. J. Wayne Plaisance, et al., in February 1976 and March 1977, and Marco J. Picciola III in September 1976.

These applications were for permits under Section 10 of the River and Harbor Act of 1899 and Section 404 of the Clean Water Act to conduct dredging and filling operations in tidal wetlands of Lafourche Parish, Louisiana. The locations of the proposed pits are on adjacent tracts of land along Louisiana Highway 1 (La. 1) between Leeville and Grand Isle, Louisiana. Because of the potential impacts of the proposed projects it was determined by the District Engineer that an environmental impact statement (EIS) would be required, pursuant to provisions of the National Environmental Policy Act of 1969, to fully assess the impacts of the proposed projects and feasible alternatives. This document is a revision of an earlier draft EIS published for part of the total projects.

Purpose of and Need for the Proposed Projects

The applicants propose to mine sand from the sandy deposits beneath the wetlands of the immediate project vicinity. Mining operations would be conducted to fill an estimated need for approximately 13,417,000 cubic yards of sand for fill material during the next 20 years in the area of Lafourche Parish, Terrebonne Parish below the Gulf Intracoastal Waterway, and Grand Isle, Louisiana.

Fill sand is currently supplied by small pits in the area which cannot meet the estimated future needs, and for large projects, the Mississippi River is a currently utilized source. Transportation and handling charges for Mississippi River sand result in increased costs to consumers in the defined area. Also, highway traffic safety is affected by increased large truck traffic.

Alternatives

A total of six alternatives were considered in this study. They include the no action, Mississippi River, existing pits, nonwetland, other wetlands, and the proposed projects alternatives. Alternative dredging depths and final levee dispositions were also considered.

The no action alternative (permit denial or withdrawal) would not prevent those in neeed of fill sand within the previously defined area from obtaining same. It would, however, force one or a combination of other actions, each of which is considered in detail. If the no action alternative were selected the existing sources of sand would have to be used. Existing local pits would be able to supply a small part of the projected need. As local pits were depleted greater reliance would be placed upon the Mississippi River as a source of fill sand. The higher cost of Mississippi River sand, due to transportation and

handling costs primarily, would probably increase the demand for a local source of fill material. This demand would result in the mining of the only local nonwetland source of sand, the chenier ridges.

The Mississippi River has been used as a source of fill sand for the area described. Sand obtained from this source is usually used in singularly large projects. The sand is hauled in by trucks or barge and then trucked to the site on which it is to be used. This type of operation may be economically feasible only when the material can be hauled directly to the site with no storage or additional hauling. Sand is dredged from the Mississippi River near Hahnville, Louisiana and stockpiled on the batture. It is then loaded into trucks for transportation to various sites. Barges have been used to transport sand to lower Lafourche Parish for large projects, such as realinement of La. 1. The environmental impacts of this alternative are insignificant. Other impacts to public safety and economics are more significant. If all of the needed sand were trucked from the Mississippi River it would involve between 660,000 and 1 million or more trips by large trucks along public highways. These trips would amount to a total of about 9,900,000 to 15,000,000 miles of additional highway useage by large trucks. This would translate into increased roadwear, consumption of fossil fuels and risk of highway accidents involving large trucks. The cost for Mississippi River sand, based upon quotes obtained in June 1980, would be from 93 to 257 percent more than sand obtained from local pits.

The existing pits which currently supply some of the needs of the area are not large enough to supply the future needs. Expansion of existing pits to meet the projected demands would require work in wetlands or on the chenier ridges in the project area. Impacts of sand mining in these areas are analyzed later.

The most extensive nonwetland areas in lower Lafourche Parish are the natural ridges along Bayou Lafourche and other natural waterways. These areas are largely developed and are not underlain by suitable material for fill. The strata underlying these ridges are composed of soils high in clay rather than sand. However, large deposits of sand may be found beneath the chenier ridges between Pass Fourchon and Chenier Caminada and La. 1 and the Gulf of Mexico. The cheniers are sandy ridges which form nonwetland islands in the marsh. The sand deposits beneath the cheniers are essentially the same as those underlying the marsh. Dredging the cheniers would result in the destruction of approximately 85 acres of unique and valuable wildlife habitat. Although the pits remaining following the dredging would provide some values to fisheries resources, because of their great depth they would become nutrient sumps, entraining organic detritus and developing anaerobic conditions unsuited to most aquatic life. The loss of these chenier ridges would, as would any dredging project in the area, represent an acceleration of land loss, the rate of which is already high.

Because of the relative homogeneity of the marshes in the proposed project area the discussion of the proposed project will suffice for this alternative.

The Picciola interests seek to extract and transport sand to be used as fill material for various projects located in the project vicinity. The Picciola site comprises 60 acres of tidal brackish marsh and open water bodies. Excavation of the site would be limited to no more than one pit at any one time which shall be no more than 8 acres in size. Perimeter levees would be constructed around each pit and would function as access roads. The discharge of all effluents and other material would be managed as per National Pollution Discharge Elimination System (NPDES) permit requirements. Excavation would be by means of a dragline equipped with a bucket dredge. No more than 50,000 cubic yards of sand would be stockpiled at the site at any one time.

The Plaisance interests propose to dredge in two locations totalling 120 acres. They have proposed three operational alternatives; 1) bucket dredge, 2) bucket and suction dredge, and 3) suction dredge. Three alternative methods of suction dredging are being considered by the Plaisance interests: 1) dredge entire pit without perimeter levees, pumping the dredged material into existing pits or new pits excavated in nonwetlands, 2) construct a perimeter levee then suction dredge the entire inclosed area, pumping the dredge material into receiving pits, and 3) dredge only open water areas within the proposed pit boundaries and pump the dredged material into receiving pits as above.

The combined consequences of the two proposed projects would include the direct permanent loss of 180 acres of wetland habitat (tidal brackish marsh and shallow water bodies), associated losses to wildlife and fisheries resources, water quality impacts associated with a deep pit (i. e., anaerobic sediments and water, nutrient entrainment, etc.), acceleration of land loss rate and negative esthetic impacts during the projects' lives. There would be positive impacts on the local economy through some employment, increased tax revenues, and increased property values. Local transportation of fill would significantly reduce the miles of highway driving over more distant sources of sand, thus representing a positive potential impact on public safety. Issuance of a permit for the proposed projects could prevent the possible destruction of the chenier ridges.

Final disposition of the perimeter levees could include one of the following: 1) complete removal of the levees, allowing free flow of waters into and out of the abandoned pits; 2) partial removal of the levees (i. e., periodic gaps) would allow water exchange, ingress and egrees for aquatic fauna, and high ground for terrestrial species to use and for amphibious species to use for shelter and resting area; 3) leaving the levees intact would isolate the abandoned pits, prevent nutrient entrainment, prevent water quality problems associated with the pits from spreading to surrounding waters, prevent ingress and egress to the pits by aquatic fauna, and provide continuous upland habitat for more terrestrial species.

Alternate dredging depths were considered. In order to obtain the necessary amount of material demanded, a shallower pit would require a greater surface

area to be used. It is doubtful that a shallower pit would result in significantly lessened water quality impacts unless the pit were no deeper than about 2 meters, below which water quality rapidly deteriorates.

Permit Conditions and Mitigation

Any permit issued would have several special conditions. First, in order to protect La.1, no dredging would take place within 150 feet of the centerline of the roadway. Second, development of the area which would be mined would be phased in 8 acre segments. Each active excavation site would be planned and sited to avoid segmentation of adjacent uncommitted wetlands. Third, to insure compliance with any permit conditions required, inspection of the dredging operations would be conducted periodically by an interagency team composed of representatives from the US Army Corps of Engineers, the pit operators, and any interested local, state, or Federal agency.

Although they have not been agreed to by the applicants, other possible mitigation and/or compensation measures include: 1) repair and/or replacement of nonfunctional and/or improperly functioning water control structures within the Wisner Wildlife Management Area, which is adjacent to the proposed project sites, this may require Corps permits under Section 10 of the River and Harbor Act of 1899 and/or Section 404 of the Clean Water Act; 2) if suitable canals with willing landowners could be found, the dredged material deposits along the canal banks could be degraded to restore the areas to wetland status, this would require Section 10 and/or Section 404 permits; 3) it may be possible to create marsh habitat in areas of shallow water too deep for emergent vegetation, however, it would again be necessary to locate suitable open water areas with willing landowners, and Section 10 and/or Section 404 permits may be required for this type of work; and 4) the applicants have indicated a possible willingness to dedicate land adjacent to Wisner Wildlife Management Area on an acre-for-acre basis as a form of compensation for unmitigable losses occasioned by their dredging operations.

Affected Environment

The Mississippi River is the nation's largest river. It supports a large waterborne commerce. There are, in the area of Hahnville, Louisiana, sand dredging operations which currently supply some of the fill material needed in the Lafourche and Terrebonne Parishes and Grand Isle area. Within the Mississippi River in the Hahnville area there are few if any plant communities. The large amounts of sediment carried by the river and high velocity of the current would tend to scour the river bottom and prevent community development. The batture of the river is vegetated by a variety of plants such as black and sandbar willows, hackberry, cottonwood, and

sycamore. A large variety of herbaceous and shrubby plants inhabit the batture. There is a small commercial fishery in the river. Between 1963 and 1976 the average annual catch from the river from Baton Rouge to the end of the jetties in Southwest Pass, amounted to almost 430,000 pounds worth $100,000. A large number of terrestrial species inhabit or utilize the batture of the river. There are no known archaeological or historical sites in the batture area in the vicinity of the sand dredging operations near Hahnville. The Mississippi River supports a great deal of waterborne commerce. This has led to the Port of New Orleans becoming the world's largest grain port, the second largest seaport in the United States and third in the world in terms of dollar value and of waterborne tonnage handled.

The chenier ridges, because of their elevation, provide striking visual or esthetic relief from the extensive marshlands that surround them. The dominant plant species on the cheniers is live oak. There are a large number of understory and other overstory plant species which inhabit the cheniers. The areal extent of the cheniers in the proposed project area is only about 85 acres. Therefore, they do not support large numbers of animal species but they do provide unique and valuable upland habitat. The cheniers serve to protect inland areas from some storm tides, provide shelter for animals during high water periods, and prevent some salinity intrusion from the Gulf of Mexico to more inland areas. There are several archaeological sites near the chenier ridges. These sites are all indian middens and are not located on the cheniers themselves. No historical sites are known to occur on these cheniers. Because of their relative isolation and limited areal extent the chenier ridges do not support any economic ventures. The primary natural resource of any economic significance is the sand deposit which underlies them. It is not known if there are any petroleum resources contained in the strata beneath the cheniers.

The marshes in the area of the proposed projects are fairly homogenous and any one location with sufficient sandy deposits and suitable access to highways is generally similar to any other location in the area. The tidal brackish and saline marshes and associated shallow open water bodies of the proposed projects area provide high quality spawning, feeding, resting, and general habitat for fisheries. At least 29 different species of fish and shellfish inhabit these marshes. Studies have indicated that these marshes support a minimum of 29 species of birds, as well as, many reptiles and amphibians. Threatened and/or endangered species which may inhabit the area include brown pelican, bald eagle, peregrin falcon, and American alligator. The nearest nesting colonies of brown pelicans to the project area is about 15 miles to the northeast on Queen Bess and Grand Terre Islands. Bald eagles are not known to nest in the project area. The nearest known active bald eagle nesting areas are located about 33 miles north of the project area. The peregrin falcon may occasionally range into the project area but does not nest there nor does it remain for any length of time. The American alligator may be present in the project area but prefers fresher waters. The proposed projects would not threaten the continued existence of any threatened or endangered species known

to inhabit the area. There are no known threatened or endangered plant species in the project area. Cultural resources are identical with the chenier ridges just discussed. The most significant economic use of the subject marshes is for fisheries production. Based upon data gathered by the New Orleans District, the marshes of the proposed projects area produce over 1,000 pounds of shellfish per acre worth over $102 per year.

Areas of Controversy

The loss of 180 acres of valuable wetlands is a central issue in these proposed projects. Land loss rates for coastal Louisiana are very high and may be accelerating. The Gulf of Mexico shoreline is retreating at a rate of about 75 to 100 feet per year in the project area. The proposed projects would hasten the rate of land loss during their lifetimes. The economic benefit to the consumers of fill sand in the area must be weighed against the loss of land, particularly wetlands which serve as valuable habitat and perform other important functions. The fate of the chenier ridges must also be considered. If a permit to dredge in wetlands is not issued the chenier owners may obtain the needed sand by mining the cheniers. The potential loss of these unique islands in the marsh must also be weighed in the balance.

Issues to be Resolved

The specific operational plan or plans to be implemented by the Plaisance interests remains to be determined. Input from the applicant and the public will be used to help make this selection.

Further mitigation and/or compensation, if any, must be decided. Federal and state agencies concerned with various aspects of these proposed projects will have opportunities to state their concerns which will be considered in taking final action on these applications.

Following on pages vii and viii is a list of environmental and statutory requirements and the proposed projects' compliance thereto.

RELATIONSHIP OF THE PROPOSED SAND DREDGING TO ENVIRONMENTAL AND STATUTORY REQUIREMENTS[1]

Requirements	Applicability
Section 9 of River and Harbor Act (R&HA) of 3 March 1899	Not Applicable
Section 10, R&HA	Full Compliance
Section 11, R&HA	Not Applicable
Section 13 of R&HA	Not Applicable
Section 14 of R&HA	Not Applicable
Section 1 of the River and Harbor Act of 1902	Not Applicable
Section 404 of the Clean Water Act (CWA)	Full Compliance
The Marine Protection, Research and Sanctuaries Act	Not Applicable
Section 401 of CWA	Full Compliance
National Environmental Policy Act	Full Compliance
Fish and Wildlife Coordination Act	Full Compliance
Migratory Marine Game Fish Act	Not Applicable
Fish and Wildlife Act of 1956	Partial Compliance
Federal Power Act of 1929	Not Applicable
National Historic Preservation Act of 1966	Full Compliance
Interstate Land Sales Full Disclosure	Not Applicable
Endangered Species Act of 1973	Full Compliance
Deepwater Ports Act of 1974	Not Applicable

Marine Mammal Protection Act of 1972	Not Applicable
Wild and Scenic River Act	Not Applicable
Land and Water Conservation Fund Act of 1965	Not Applicable
Clean Air Act	Full Compliance
Floodplain Management (E.O. 11988)	Not Applicable
Louisiana Air Control Act	Full Compliance
Louisiana Archaeological Treasure Act	Full Compliance
Louisiana Historic District Preservation Act	Not Applicable
Louisiana Scenic Streams Act	Full Compliance
Louisiana Coastal Resources Program	Not Applicable[2]
Area-wide Comprehensive Plan	Not Applicable

[1]/The compliance categories used in this table were assigned based on the following definitions:

a. Full Compliance - All regulatory procedures of the statute, or other policy and related regulations have been met.

b. Partial Compliance - Some regulatory procedures of the statute, or other policy and related regulations remain to be met.

c. Noncompliance - None of the regulatory procedures of the statute, or other policy and related regulations have been met.

d. Not Applicable - Statute, or other policy not applicable.

[2]/Coastal Use permit is not required because the Coastal Management Section of the Louisiana Department of Natural Resources did not review or comment on any work advertised by Corps of Engineers Regulatory Functions Branch public notices dated prior to 1 October 1980 (letter dated 5 January 1981 from Joel L. Lindsey, Coastal Management Section, Louisiana Department of Natural Resources, P.O. Box 44396, Baton Rouge, Louisiana). The public notices for the proposed sand dredging projects were dated 4 October 1976.

TABLE OF CONTENTS

Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

TABLES

Tables (continued)

Tables (continued) | Page

FIGURES

1. Introduction and Background, and Purpose of and Need for the Proposed Projects.

1.1 Introduction and Background.

The New Orleans District, US Army Corps of Engineers, received an application to dredge sand in Lafourche Parish for fill for various purposes from Mr. J. Wayne Plaisance, et al., in February 1976. In August 1976, that application was revised to include additional pits. In September 1976, an application to dredge sand in an area adjacent to the proposed Plaisance pits was submitted by Mr. Marco J. Picciola III, potential competitors of the Plaisance interests. Mr. J. Wayne Plaisance submitted a second application to backfill existing pits with sand for resale as fill material in March 1977. The Corps' regulatory authority for the proposed projects is derived from Section 10 of the River and Harbor Act of 1899 and Section 404 of the Clean Water Act.

It was determined in March 1976 that an environmental impact statement (EIS) would be required to comply with provisions of the National Environmental Policy Act of 1969. At that time, both applicants had either applied for permits to dredge sand or had contacted New Orleans District to discuss regulatory requirements for the proposed work. It was originally determined and agreed to by all parties that the Office of Highways, Louisiana Department of Transportation and Development (LDTD), would include the impacts of the proposed sand mining operations in their EIS for relocation of a portion of Louisiana Highway 1 (La. 1). In December 1977, LDTD advised New Orleans District that they would not do the EIS and the applicants were advised that they would need to provide data for an EIS.

By May 1978, the Picciola interests had retained a consultant to prepare their data for an EIS. The Plaisance interests had not yet informed New Orleans District of their selection of a consultant, if any. Consequently, it was determined that an EIS would be prepared for the Picciola application and that the Plaisance interests could later provide data for a supplement to the final EIS, if they decided to pursue their proposed projects.

A draft EIS (DEIS) was published by New Orleans District in September 1978. This DEIS covered the Picciola application. The DEIS was on public notice until November 1978 at which time the comment period expired. Comments received were forwarded to the applicants for response in March 1979.

The consultants for the Plaisance interests submitted a supplement to the final EIS in April 1979. There was as yet, however, no final EIS (FEIS) to supplement. The Picciola interests submitted their responses to comments on the DEIS in May 1979.

The original Picciola application was for dredging 112 acres of wetland to obtain 6,380,000 cubic yards of sand. The combined Plaisance applications were for 665 acres of wetlands and would provide 53,643,333 cubic yards of sand if dredged to 50 feet in depth and 64,372,000 cubic yards if dredged to 60 feet.

This would provide a total of from over 60 million to over 70 million cubic yards of sand. The justified need for sand for fill in both the DEIS and the supplement amounted to only slightly over 3 million cubic yards. With this large discrepancy between the documented need for sand and the proposed supply for which the applicants were applying for permits to dredge, it was concluded that either the applicants would need to reduce the scope of their separate proposals drastically, a much greater need for sand would have to be documented, or no permits could be issued.

The applicants were asked to provide data to document the need for sand in the project area (i.e., Lafourche Parish, Terrebonne Parish below the Gulf Intracoastal Waterway, and Grand Isle) to ascertain the need for sand for fill until the year 2000 A.D. Such data was then correlated to remove duplication and a total need was obtained. An average dredging depth of 45 feet was then assumed and the areal extent of dredging necessary was determined. The figure thus determined was 180 acres, which represented a rather significant reduction over the original applications. In a meeting held at New Orleans District in June 1980, the applicants were informed of these findings and New Orleans Districts' determination that a new revised draft EIS would be prepared including both projects. The applicants also agreed to certain conditions if permits are issued. These are discussed at Section 2.8 of this document. The apportionment of the 180 acres between the applicants was negotiated and agreed to by themselves at the June meeting.

The comments received on the earlier DEIS were deemed to constitute sufficient input from Federal, state, and local governmental bodies, concerned groups, and private citizens to comply with the requirement for a scoping process (40 CFR 1501.7). New Orleans District and the applicants will continue to coordinate with US Environmental Protection Agency, US Fish and Wildlife Service, National Marine Fisheries Service, Louisiana Department of Wildlife and Fisheries, and any other concerned agency, group, or individual to resolve conflicts, reduce impacts, and arrive at appropriate mitigative measures for the proposed project. However, the two applications should receive individual consideration by all agencies, groups, and individuals concerned with the proposed projects. Final action with regards to either applicant will be based upon the merits of the individual proposals.

1.2 Purpose of and Need for the Proposed Projects.

The applicants (the Plaisance interests and the Picciola interests) propose to mine sand by means of bucket and/or suction dredge to provide a readily available source of fill material for local (i.e., Lafourche and Terrebonne Parishes south of the Gulf Intracoastal Waterway and Grand Isle, Louisiana) commercial, industrial, residential, and public works projects. There is an estimated immediate need (i.e., next 3 years) for about 4,500,000 cubic

yards of fill material in this area and an additional 8,917,000 cubic yards by the year 2000 A.D. Projects known to need fill material at this time or those reasonably certain of requiring fill in the forseeable future and the estimated amounts of fill are indicated in Table 1.2-1.

Currently, fill material for this area is being obtained from sources such as the Mississippi River and local pits, including small existing pits in wetlands, and existing or proposed pits on the chenier ridges. These sources will be treated in detail in other sections of this document.

Sand obtained from sources located som distance from the project area, such as the Mississippi River, must be transported long distances and either used immediately or stockpiled. Handling the material several times causes the costs to consumers to increase significantly. In addition, the increased time and distance of highway utilization by large trucks increases the chances for highway accidents and resultant death and/or injury to humans and property damage and/or loss. Increased road wear, maintenance costs, and use of fossil fuels and other petroleum costs are also considerations indicating a need for a local source of fill material.

TABLE 1.2-1

ESTIMATED DEMAND FOR FILL IN TERREBONNE AND LAFOURCHE PARISHES AND GRAND ISLE, LOUISIANA, THROUGH 2000 A.D.

PROJECT	AMOUNT OF FILL
1. Louisiana Department of Transportation and Development	
a. Relocation La. Highway No. 1 (Galliano to Larose)	1,400,000 cubic yards
b. La. Highway No. 1 (Golden Meadow to Leeville)	400,000 cubic yards
c. Relocation La. Highway No. 1 (Larose to Raceland)	352,000 cubic yards
2. Louisiana Offshore Oilport, Inc.	375,000 cubic yards
3. Lafourche Parish Sanitary Landfill	100,000 cubic yards
4. Terrebonne Parish Sanitary Landfill	500,000 cubic yards
5. Solid Waste Disposal, Inc. (sanitary landfill)	85,000 cubic yards
6. Lafourche Parish - Housing and commercial	4,024,000 cubic yards
7. Terrebonne Parish - Housing and commercial	2,031,000 cubic yards
8. Petroleum Industry	2,000,000 cubic yards
9. Public Works (including Lafourche Port Commission)	250,000 cubic yards
10. Grand Isle (Camp construction and sanitary landfill)	1,000,000 cubic yards
Total estimated demand (through 2000 A.D.)	12,517,000 cubic yards

25

Sources:

1. Louisiana Department of Transportation and Development and Burke & Associates

2. J. Wayne Plaisance, Inc.

3. Lafourche Parish Police Jury

4. Terrebonne Parish Police Jury

5. Solid Waste Disposal, Inc.

6. J. Wayne Plaisance, Inc.

7. T. Baker Smith & Son, Inc.

8. J. Wayne Plaisance, Inc.

9. J. Wayne Plaisance, Inc.

10. Picciola & Associates, Inc., and J. Wayne Plaisance, Inc.

2. Alternatives.

2.1 No Action. The no action alternative is just that - no permit, and no sand dredging as proposed. Sand for fill would be obtained from existing sources, or new sources elsewhere.

2.2 Mississippi River. Fill sand is available from sand dredging operations in the Mississippi River. Sand obtained from this source is transported to the study area via truck and/or barge.

2.3 Existing Pits. There are several existing sand dredging operations in the study area. These operations are in pits located in wetland areas or are on the chenier ridges, which are characteristic of the proposed project area.

2.4 Nonwetland Sites. There are natural levees and ridges in the study area which are nonwetland. It is not possible to obtain fill sand from these areas because there are no usable sand strata underlying these ridges. Another nonwetland source of fill sand is the chenier ridge system. These chenier ridges are underlain by the same sand formations as the marsh.

2.5 Other Wetland Sites. Other wetland areas within the study area may be underlain by suitable sand strata and dredging in these areas could provide the necessary fill material.

2.6 Proposed Projects.

2.6.1 Picciola Proposal. The Picciola interests seek to extract and transport sand to be used as fill material for various projects in the vicinity of the proposed permits site (see Table 1.2-1). The proposed Picciola permit site is situated adjacent to the La. 1 as depicted in Figure 3.4-1.

This site comprises 60 acres in toto. However, excavation and mining activities shall be limited to no more than one pit at any one time which shall be 8 acres in size. Each 8-acre pit shall constitute an active excavation site. Perimeter levees shall be constructed around each active site. These perimeter levees shall be planned and sited to avoid segmentation of those wetlands areas within the proposed permit site not previously committed to extraction activities. Furthermore, these perimeter levees shall be constructed so as to prevent release of pollutants as per the National Pollution Discharge Elimination System (NPDES) permit. All discharge of effluents and other material shall be managed as per NPDES permit requirements. These levees, once constructed, shall be used as roads to provide access to the active excavation site only as necessary and shall be maintained in proper condition.

Extraction of sand from each active excavation site shall be done by dragline equipped with a bucket dredge. After drying, the sand shall be removed from the active excavation site by truck and shall be transported via La. 1 to the various projects where it will be utilized. Stockpiling of sand at the active

excavation site shall be limited to no more than 50,000 cubic yards at any one time.

Extraction of sand shall be limited to one active excavation site at any one time. Extraction and transportation of sand shall not occur from a new 8-acre pit until the previous active excavation site has been substantially exhausted.

The initial phase in the development of the proposed Picciola permit site will be the construction of the perimeter levees (Figure 2.6-1). These levees will be sited to avoid segmentation of those areas within the proposed permit area not previously committed to extraction activities. Extraction will be limited to one active excavation site at a time. The purpose of these levees is to isolate each active excavation site from the surrounding area. The isolation will prohibit the interchange of dredge materials and slurry produced within the active excavation site with the waters of adjacent areas.

The next phase in the development of the proposed Picciola permit site will be the excavation of sand. A bucket dredge will be used to accomplish the excavation. The sand will be placed along the edges of the active excavation site to dry. Interstitial water from these materials will be restricted to the excavation site. Water from the proposed site will be released to outside areas after sediment has settled from the waters inside the levee confinement.

The third phase in the development of the proposed Picciola permit site will be the transportation of sand to areas where the sand will be used. Trucks will be used to haul the material. Ingress and egress on the proposed site will be via the perimeter levee.

2.6.2 Plaisance Proposal. The Plaisance interests propose to dredge in two pit areas, totalling 120 acres. These proposed pit areas are both located on the south side of La. 1 and east of the Picciola site (see Figure 3.4-1).

A number of operational plans utilizing bucket and suction dredges have been proposed by the Plaisance interests.

2.6.2.1 Bucket Dredge. The first step in the basic plan would be to construct the perimeter levees (Figure 2.6-2). These levees would prevent a direct exchange of dredge materials and slurry waters within the project area with adjacent waters outside of the project area. The levees would also serve as roads allowing trucks ingress and egress on the project site. The dredging activities and levee construction would be in 8-acre increments. The first 15 to 20 feet of material would be excavated by bucket dredge. The excavated material would be stockpiled along the pit edges to dry; interstitial water leaching from the stockpiled material would seep into the surrounding areas along the pit edges, much of which would find its way back into the dredge pit. This water would be pumped into nearby pits which have been divided into a minimum of two cells. These cells would serve as settling pits, allowing suspended sediments to settle out of the slurry before the water is released to areas outside the levee confinements.

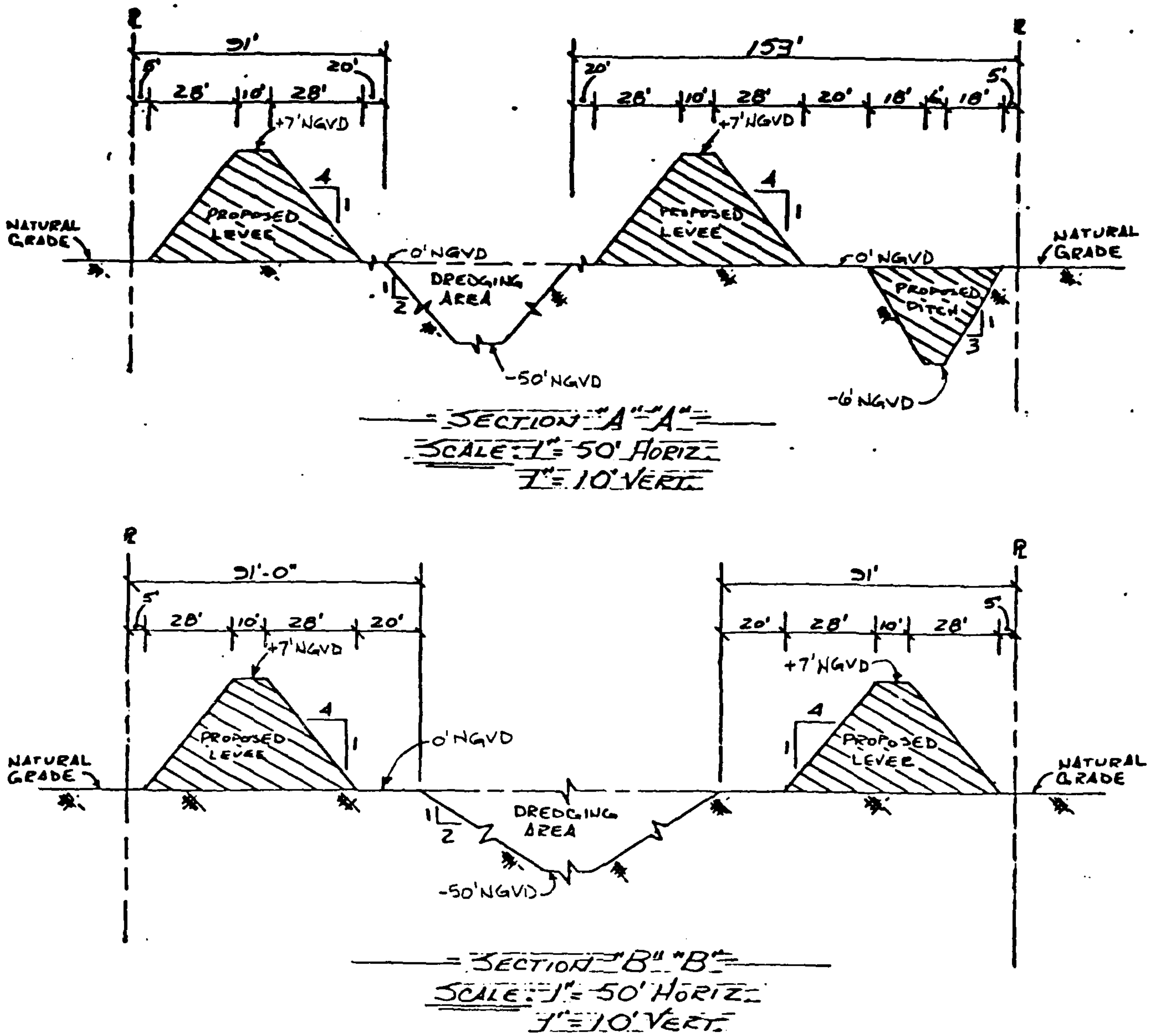
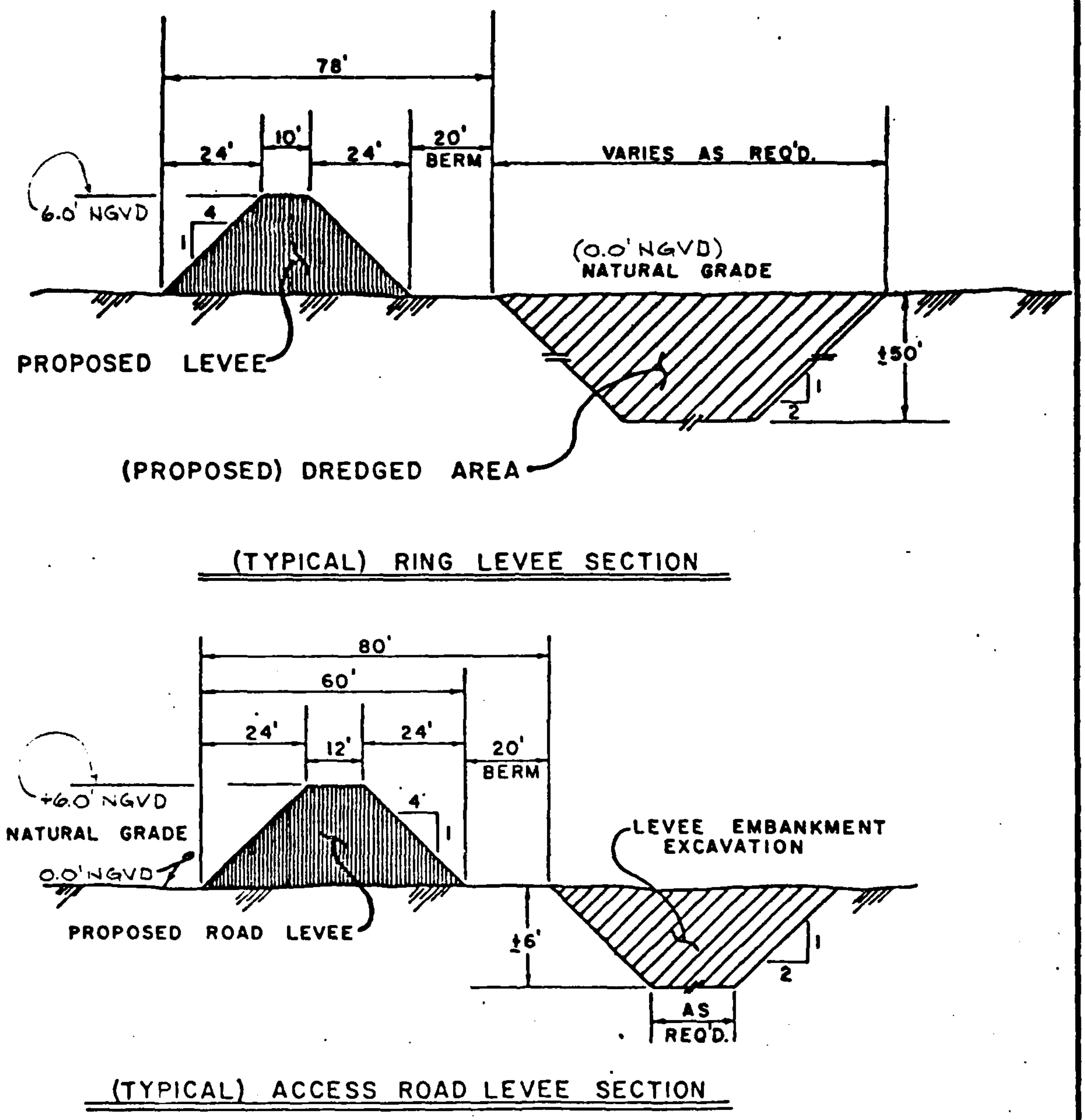


FIGURE 2.6-1

CROSS SECTION OF PROPOSED PICCIOLA PROJECT

SAND DREDGING OPERATIONS IN LAFOURCHE PARISH, NEAR LEEVILLE, LOUISIANA



SCALE: 1" = 40'-0" HORIZ.
1" = 10'-0" VERT.

FIGURE 2.6-2

CROSS SECTION OF PROPOSED PLAISANCE PROJECT

SAND DREDGING OPERATIONS IN LAFOURCHE PARISH, NEAR LEEVILLE, LOUISIANA

2.6.2.2 Bucket and Suction Dredge. A combination of methods may be utilized to excavate sand from the pit areas. The first 15 to 20 feet would be excavated by bucket dredge as described in 2.6.2.1 above. A suction dredge would be used to excavate the pit to the remaining desired depths. One half of the pit would be dredged, pumping the material to the other half of the pit which would be divided into three settling cells. These cells would function as those cells described in 2.6.2.1 above, allowing the suspended sediments to settle out of the slurry before water is released to the surrounding areas. The dry material collected in the settling cells would be removed by dragline and loaded onto trucks to be hauled away.

When the desired depth is reached, the process would be reversed by locating the dredge in the settling pit area and pumping back to the dredged area, which in turn has been divided into three settling cells.

2.6.2.3 Suction Dredging. The proposed pit locations may be excavated by suction dredge only. Three procedures could be utilized to excavate sand by suction dredge:

2.6.2.3.1 The first method would consist of dredging the entire pit area without perimeter levees and pumping the spoil into existing pits from previous operations or retaining pits constructed on nonwetlands. The receiving pits would function as those described in part 2.6.2.2 above for suction dredge activities.

2.6.2.3.2 A second method would entail first building perimeter levees as those described in part 2.6.2.1 above and suction dredging the entire inclosed area, pumping the dredged material into existing pits or retaining pits constructed on adjacent nonwetlands. Either of these two types of receiving pits would be divided into three settling cells. These cells would also function as those described in part 2.6.2.2 above for suction dredge activities.

2.6.2.3.3 A third alternative method would consist of suction dredging only surface water areas within the proposed pit boundaries rather than dredging the entire pit area. No levee construction would be required for this type of operation and the dredge material would be pumped to existing pits or nonwetland locations as described in the preceding paragraph.

2.7 Alternate Levee Disposition. Three alternative levee dispositions following the conclusion of dredging operations have been considered.

2.7.1 The levees could be completely degraded and the area returned to original grade. The materials used in construction of the levees would be hauled away.

2.7.2 Breaches could be cut in the levees at specified intervals. The material thus removed could be hauled away or placed on the remaining levee.

2.7.3 The levees could be left in place after suspension of dredging activities.

2.8 Alternate Dredging Depths. The target resource could be obtained from shallower depths than proposed. This would necessitate dredging over a larger area to obtain a given amount of sand.

2.9 Permit Conditions and Mitigation and/or Compensation Plans. It is US Army Corps of Engineers policy to condition permits in order to fulfill legal requirments and/or to achieve the goals and objectives of particular legislation or the policy of the Chief of Engineers to protect the public interest. Conditioning of permits is in response to both primary and secondary effects on the public interest. Primary effects are those effects which would occur directly as a result of the issuance of a permit or subsequent operations of the activity in the immediate vicinity of a permitted work. Secondary effects include those activities on water or land that could be expected to occur as follow-up to the completion of the permitted activity and the effects associated with it. Conditioning of permits to respond to secondary effects is done only if the effect is clearly known rather than speculative; if no other Federal, state, or local enforcement or protective mechanisms exist to respond to this effect; and if there is reasonable assurance that the condition would be enforced aganist the permittee rather than aganist unknown individuals. The US Army Corps of Engineers does not condition to respond to effects on the public interest when existing Federal, state or local laws or programs accomplish the same purpose. Primary emphasis in the formulation of conditions are directed toward the avoidance or mitigation of impacts on fish and wildlife values directly associated with the construction and subsequent operation of the permitted activity. It is not US Army Corps of Engineers policy to become directly involved in negotiations with a permit applicant to achieve commitments on land acquisition as a primary means of securing another Federal agency's concurrence to the issuance of a permit. Although agreements involving the acquisition of land may evolve on a case-by-case basis, these agreements generally are not included as special conditions to a permit, but instead, remain enforceable only through the parties to the agreement. Certain cases, however, will require the dedication of particular portions of land to mitigate fish and wildlife losses, and this dedication may involve a set aside of certain lands already owned by the applicant, the acquisition of lands contiguous to the project site by the applicant, to manage for fish and wildlife purposes, and even the transfer of land to others for management purposes. In formulating a position on such cases, the District Engineer is guided by the previously mentioned established policies.

2.9.1 Permit Conditions. Any permit issued would be conditioned as follows:

2.9.1.1 No dredging would take place within 150 feet of the centerline of La. 1.

2.9.1.2 The phasing of the development of the proposed dredging sites would be configured so that extraction and transportation would occur in a systematic and practicable fashion. Excavation and transportation would be limited to one 8-acre active excavation site at any one time. Each active excavation site would be planned and sited to avoid segmentation of those adjacent uncommitted wetlands.

2.9.1.3 Inspection of the dredging operations would be conducted periodically to insure compliance with any permit conditions required. These inspections would be conducted by an interagency team which would include representatives from the US Army Corps of Engineers, the pit operators, and any interested local, state, or Federal agency.

2.9.2 Mitigation and/or Compensation Plans. The applicants have not agreed to any mitigation measures, however, the following are possibilities which may be considered:

2.9.2.1 The Wisner Wildlife Management Area is located immediately adjacent to both proposed project sites. This wildlife management area is operated by the Louisiana Department of Wildlife and Fisheries. There are numerous water control structures located within this management area, many of which are in need of repair. As part of a possible mitigation/compensation plan, either one or both applicants could undertake to restore these water control structures to functional condition. This would reduce salinity intrusion and loss of fresh and intermediate marsh habitat. It could also restrict ingress and egress by some or all marine organisms. Such structural restoration could also require Corps permits under Section 10 of the River and Harbor Act of 1899 and/or Section 404 of the Clean Water Act.

2.9.2.2. It has recently become an occasional mitigation practice for applicants for permits to dredge canals in wetlands to "restore" old unused canals by pulling the dredged material along the sides back into the canal.

This practice results in the sides of the canal being returned to natural grade. Due to erosion, subsidence, and oxidation there is usually not enough dredged material remaining to completely restore the canal to natural grade and the end result is some natural marsh restoration where the dredged material was removed and a shallow open water area, too deep to support marsh vegetation.

This plan would require permits and also it would be necessary to find unused canals and willing landowners, a combination which could be difficult to find in enough quantity to provide suitable mitigation.

2.9.2.3 Marsh creation is another possible means of providing mitigation. This would require filling an area of open water to an elevation that would support natural marsh vegetation. Such an area could be allowed to revegatate naturally or it could be planted with appropriate species. Marsh creation is a very expensive undertaking. In New Jersey, 2.6 hectares of marsh were created at a cost of $76,334 in the summer of 1977 (Fauer and Gritzuk, 1979). Again it would be necessary to locate appropriate open water areas with willing landowners before this option could even begin to be thought of as feasible.

2.9.2.4 Both applicants for the proposed sand dredging projects own wetlands acreage adjacent to the Wisner Wildlife Management Area. These areas are not proposed for dredging activities. The applicants have indicated a possible willingness to compensate for unmitigatable losses by donating or dedicating land on an acre-for-acre basis to the management area. This would place 180 acres of marsh not now accessible to the public into state ownership and/or management. An acre-for-acre compensation would not compensate for the permanent loss of wildlife habitat which the proposed projects would cause. It would be necessary to conduct a habitat evaluation procedure on the tract to estimate the actual loss the proposed projects would cause the wildlife and the amount of land necessary to place under management to compensate for such loss. The Wisner Wildlife Management Area is not owned by the State of Louisiana but is leased from the City of New Orleans, and is located in an area which has one of the highest rates of land loss in the State of Louisiana.

3. Affected Environment.

3.1 Mississippi River. There is an existing sand dredging industry in the Mississippi River. The existing Mississippi River sand dredging operation closest to the study area is at Hahnville, Louisiana (see map, Figure 3.1-1). Sand may be dredged from the river bottom, loaded onto barges, and transported via inland waterways to the study area. An alternate method is to dredge sand from the river bottom, stockpile it on the batture for dewatering, and then load it into trucks for transportation to the study area via public roads.

3.1.1 Significant Resources.

3.1.1.1 Agriculture. There are no agricultural resources in the Mississippi River or along its banks which are, or would be, affected by sand dredging.

3.1.1.2 Fisheries. From 1963 through 1976, the annual average fish catch from the Mississippi River, from Baton Rouge to the end of jetties in Southwest Pass, amounted to almost 430,000 pounds worth $100,000. Species caught included catfish, bullheads, buffalo, carp, black and red drum, gar, spotted and sand seatrout, freshwater drum, bowfin, crawfish, and turtles. Freshwater sportfish species found in the Mississippi River and in the freshwater area of the Delta-Breton National Wildlife Refuge and the Pass-a-Loutre Waterfowl Management Area include largemouth bass; black and white crappie, bluegill, redear, and other sunfish; channel, blue, and flathead catfish; yellow bullheads; and white bass. Important saltwater species present in West Bay, East Bay, and Garden Island Bay include shrimp, mullet, ladyfish, menhaden, anchovy, gafftopsail and sea catfish, red and black drum, spot, sheepshead, flounder, spotted and sand seatrout, and Atlantic croaker.

3.1.1.3 Wildlife. There are no significant wildlife resources in this area.

3.1.1.4 Energy. There are no energy resources in or along the Mississippi River in the Hahnville area.

3.1.1.5 Recreation. Due to the industrial/commercial use of the Mississippi River, there is very little, if any, recreational boating, except for tour boats which sail the river. There may be some recreational fishing in the river but this activity is also severely limited. There is little recreational activity of any kind on the river.

3.1.1.6 Navigation. The Mississippi River is the major inland waterway in the United States. Between the mouth of the river and Baton Rouge, Louisiana, is the greatest port area in the country. There is a great amount of waterborne traffic in the form of ocean-going vessels, barge tows, and other vessels which pass any one point on the river each day. The US Army Corps of Engineers and the US Coast Guard have primary responsibility for maintaining navigability and navigation on the river. No work will be allowed to take place within the river which would have a negative impact on navigation.

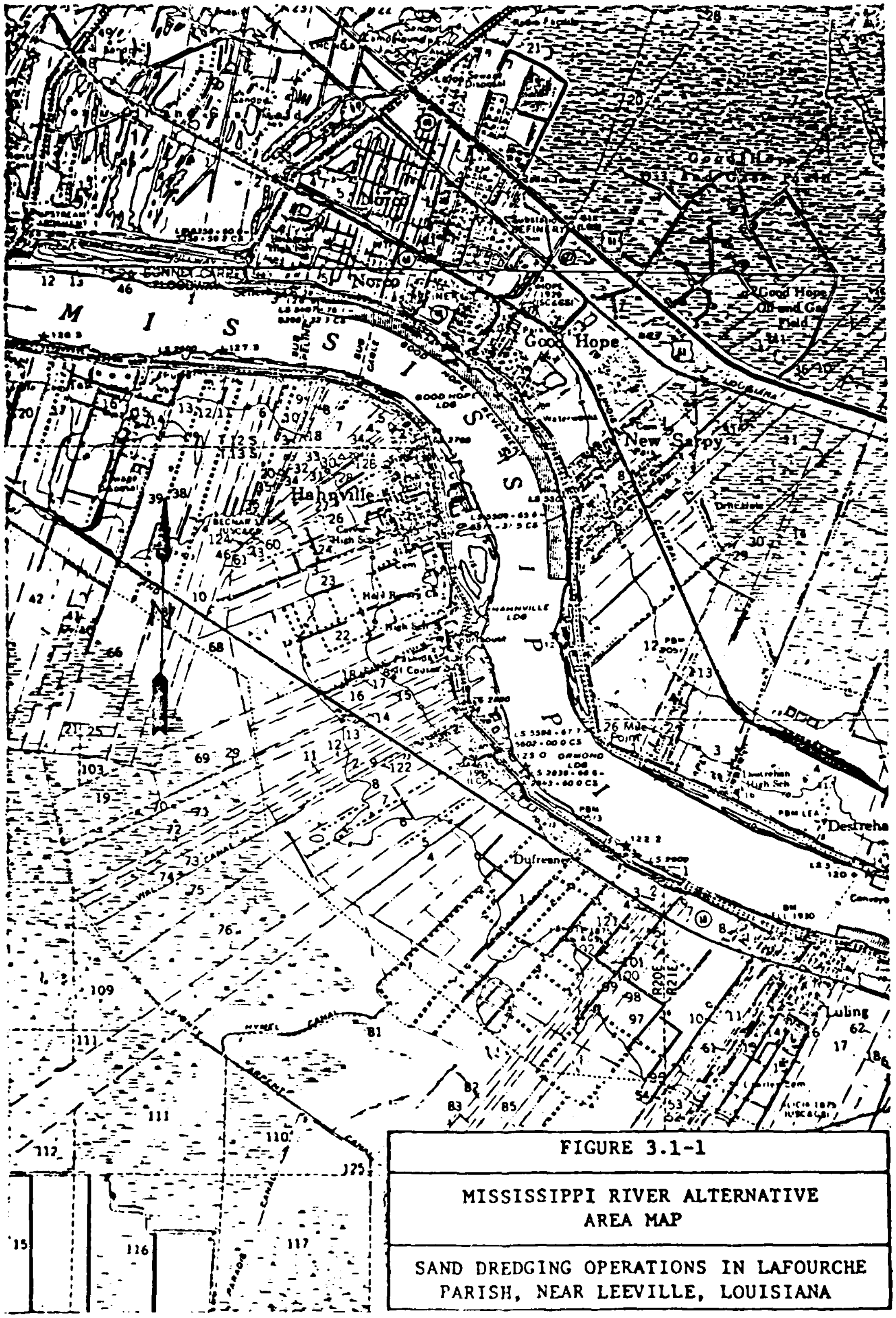


FIGURE 3.1-1

MISSISSIPPI RIVER ALTERNATIVE
AREA MAP

SAND DREDGING OPERATIONS IN LAFOURCHE PARISH, NEAR LEEVILLE, LOUISIANA

SOURCE: U.S.C. & G.S.　　　　SCALE: 1" = 5000'

3.1.2 Environmental Setting.

3.1.2.1 Vegetation. Plant communities in the Mississippi River near Hahnville are virtually nonexistent. This is due primarily to the swiftness of the current and the great fluctuation in river stages throughout the year. There have been no phytoplankton studies conducted of any significance, but it is assumed that phytoplankton is of relatively little importance in the river. On the river batture, the plant communities were studied by Montz (1970). The common arboreal species according to Montz were black willow, sandbar willow, hackberry, cottonwood, and sycamore. Between the point of high water contact and the river, the most frequent understory plants found by Montz were peppervine, aster, trumpet creeper, bermuda grass, eclipta, morning glory, northern frogbit, water paspalum, saltmarsh pluchea, poison ivy, *Rubus* sp., coffeeweed, Johnson grass, and cocklebur. Between the high water marks and the levee, the most frequent understory vegetation consisted of ragweed, peppervine, aster, trumpet creeper, roughleaf dogwood, horsetail, morning glory, poison ivy, blackberry, dewberry, elderberry, goldenrod, Johnson grass, vervain, and cocklebur. A detailed list of vegetation of the Mississippi River batture is in Appendix A. The batture area is a highly disturbed area due to levee construction, fluctuation of river stages, and use for commercial and industrial sites.

3.1.2.2 Fauna.

3.1.2.2.1 Fisheries. See 3.1.1.2 of this section.

3.1.2.2.2 Terrestrial Fauna. The batture area of the river may be utilized by a large number of bird species. Numerous species of passerine birds, such as grackles, blackbirds, starlings, etc., could utilize this area for nesting, resting, and feeding. Wading birds such as egrets and herons may utilize the batture and river edge for feeding and resting habitat. Mottled ducks may utilize borrow pits in the batture on a year-round basis for feeding and resting. Migratory waterfowl may also use this area from time to time. Endangered and/or threatened bird species that may utilize this area on an occasional basis are the bald eagle and the peregrin falcon.

The most predominant mammalian species expected to occur on the batture of the Mississippi River are raccoon, opossum, rats, mice, and perhaps mink, river otter, and white-tailed deer. No known threatened or endangered mammalian species are found on the batture in this area.

Numerous species of nonpoisonous snakes would be expected to inhabit the batture area. These include such types of snakes as water snakes, hog-nosed snakes, and others. Poisonous species of snakes, such as the cottonmouth moccasin, would also be expected to be found here. Various species of frogs, toads, and turtles would utilize this habitat as well.

3.1.2.3 Water quality. Tables 3.1-1 through 3.1-5 summarize water quality data from the Mississippi River. Most of the data is from a sampling station at Luling, Louisiana. A detailed treatment of water quality of the lower Mississippi is available in the New Orleans Corps of Engineers District study, Deep Draft Access to the Ports of New Orleans and Baton Rouge, Louisiana.

3.1.2.4 Wildlife Management Areas. The nearest wildlife management area to the Hahnville site is Lake Salvador Wildlife Management Area. This is a unit of the Louisiana Department of Wildlife and Fisheries and is approximately 10 miles to the southeast of Hahnville.

3.1.3 Socioeconomic.

3.1.3.1 Archeological Sites. There are no known archeological sites in the Mississippi River or on the batture in this area.

3.1.3.2. Historical Sites. There are no known historical sites in the Mississippi River or on the batture in this area.

3.1.3.3. Economy. Due to the presence of nearby natural resources and its location on the crossroads of internal and foreign commerce, the Mississippi River below Baton Rouge has experienced substantial economic growth. The economy is based primarily upon extensive petrochemical and basic metal industrial developments in the Baton Rouge area and port operations, tourism, and shipbuilding around New Orleans. New Orleans, the largest city in the study area, is a financial and trade center for a large region in the Deep South.

A dramatic change in the economy of the study area was induced in the 1940's by the exploration and exploitation of the area's abundant mineral resources -- primarily petroleum and natural gas, and to a lesser extent, sulphur and salt. Mineral production, including onshore and offshore production, exerts strong influence on the economy of the area and the state. A large portion of the state's annual petroleum output of 650 million barrels is funneled through the petrochemical complexes situated along the Baton Rouge-New Orleans-Gulf corridor. In 1975, the aggregate value of minerals produced in the study area amounted to $3.0 billion.

The Ports of New Orleans and Baton Rouge have been dominant factors in the economy of the study area, and that of the state as a whole, adding millions of dollars annually to the state's treasury and providing thousands of jobs through the many services needed to carry on domestic and foreign trade. It is estimated that the economic effects of the activities of these two ports total over $2 billion annually. Principal cargoes handled are petroleum, chemicals, grains, soybeans, and ores.

The Port of New Orleans is the world's largest grain port, and ranks as the second largest seaport in the United States and third in the world in terms of dollar value and of waterborne tonnage handled. Nearly 5,000 ships call at its

TABLE 3.1-1

SUSPENDED SEDIMENT LOADS IN
THE MISSISSIPPI RIVER BELOW RED RIVER LANDING[1,2]

Water Year (Oct-Sep)	Total Measured Sed. Load (1,000 tons)	Sand-Silt Ratio Sand (Tons x 1,000)	%	Silt (Tons x 1,000)	%	Water Year Discharge (1,000 cfs)	Average Sediment Concen. (in PPM)
49-50	548,330	107,770	20	440,560	80	245,200	828
50-51	575,280	67,600	12	507,680	88	224,810	947
51-52	408,390	73,820	18	334,570	82	200,660	754
52-53	212,580	28,920	14	183,660	86	142,200	552
53-54	107,730	14,090	13	93,650	87	88,660	449
54-55	211,490	39,930	19	171,550	81	137,460	570
55-56	161,220	25,920	16	135,300	84	127,530	468
56-57	291,388	53,043	18	238,345	82	172,875	624
57-58	325,774	95,203	29	230,571	71	195,653	616
58-59	230,504	78,693	34	151,811	66	129,253	660
59-60	318,234	77,219	24	241,015	76	163,850	718
60-61	231,754	71,471	31	160,283	69	168,133	510
61-62	264,031	94,037	36	169,994	64	191,007	512
62-63	100,197	23,770	24	76,627	76	105,125	353
63-64	121,697	18,242	15	103,455	85	124,967	361
64-65	203,678	41,316	20	162,362	80	150,152	502
65-66	174,645	46,144	26	128,501	74	138,020	469
66-67	111,200	15,265	14	95,835	86	131,843	312
67-68	155,577	36,454	23	119,123	77	163,071	353
68-69	155,576	39,373	25	116,203	75	167,999	343
69-70	148,907	48,969	33	99,938	67	151,448	364
70-71	181,913	75,410	41	106,503	59	147,586	456
71-72	152,166	47,945	32	104,221	68	151,057	373
72-73	227,574	75,188	33	152,386	67	266,099	316
73-74	197,205	47,688	24	149,517	76	230,846	316
74-75	164,805	40,375	24	124,430	76	203,806	300
75-76	115,[illegible]34	20,258	18	95,176	82	145,275	294
76-77	80,998	9,532	12	71,466	88	113,247	265

1/The sand fraction is the material retained on the No. 230 sieve (0.062 mm). Silt fraction includes all of the fine material passing the No. 230 sieve. Sampling at Baton Rouge, Louisiana, before Mar 58 and at Red River Landing between Mar 58 and Jun 63, and at Tarbert Landing from then to present.

2/Source: US Army Corps of Engineers, New Orleans District, 1981. Deep-Draft Access to the Ports of New Orleans and Baton Rouge, Louisiana.

TABLE 3.1-2

MISSISSIPPI RIVER CHEMICAL AND PHYSICAL CHARACTERISTICS AT LULING, LOUISIANA - 1975 THROUGH 1977[1]

PARAMETER	RANGE IN CONCENTRATION MEAN	MAXIMUM	MINIMUM
Specific Conductance, micromhos per cm at 25°C	390.0	636.0	219.0
Hardness mg/l	146.0	210.0	86.0
Calcium mg/l	41.0	58.0	26.0
Magnesium mg/l	10.9	21.0	3.2
Sodium mg/l	22.0	53.0	7.6
Potassium mg/l	3.0	5.6	1.2
Bicarbonate mg/l	125.0	194.0	67.0
Sulfate mg/l	52.0	100.0	28.0
Chloride mg/l	25.0	65.0	12.0
Dissolved solids mg/l	241.0	344.0	151.0
Flouride mg/l	0.42	1.4	0.0
Temperature °C	18.0	32.0	3.0
Color, platnium-cobalt scale units	20.0	100.0	0.0

1/Source: US Army Corps of Engineers, New Orleans District, 1981. Deep-Draft Access to the Ports of New Orleans and Baton Rouge, Louisiana.

TABLE 3.1-3

MISSISSIPPI RIVER AT LULING, LOUISIANA
TRACE METALS STATISTICAL SUMMARY 1973-1977

Metal	Dissolved				Total				Hexavalent			
	N	Max	Min	Mean	N	Max	Min	Mean	N	Max	Min	Mean
Arsenic (50)	106	15.0	0	1.40	29.0	7.0	1	2.90				
Cadmium (10)	110	9.0	0	.70	28.0	10.0	0	.60				
Chromium (50)					29.0	40.0	<10	--	107	<10	0	--
Iron (300)	107	170.0	0	22.10								
Lead (50)	107	10.0	0	1.70	27.0	16	0	6.5				
Mercury (2)	29	.2	0	.04	108	1.6	0	.09				
Nickel	14	7.0	0	2.10	14	14	3	7.4				
Zinc (5000)	108	190.0	0	16.50	29	70	10	29.3				

NOTE: Concentrations in micrograms per liter (ug/l)
Numbers in parenthesis ( ) are maximum recommended limits for public water supply
N = number of samples

Source: US Army Corps of Engineers, New Orleans District, 1981. Deep-Draft Access to the Ports of New Orleans and Baton Rouge, Louisiana.

TABLE 3.1-4

DISSOLVED OXYGEN CONCENTRATIONS IN MISSISSIPPI RIVER FOR WATER YEAR 1978 [1]

LOCATION	CONCENTRATION (mg/l) MEAN	MAXIMUM	MINIMUM
St. Francisville	9.1	12.7	7.6
Plaquemine	8.8	12.8	6.1
Union	9.0	12.8	6.5
Luling	9.0	13.0	6.5
New Orleans	8.8	13.3	6.3
Violet	8.8	12.8	6.6
Belle Chasse	9.0	13.2	6.5
Venice	8.6	12.0	6.4

1/October 1977 through 30 September 1978

Source: US Army Corps of Engineers, New Orleans District, 1981. Deep-Draft Access to the Ports of New Orleans and Baton Rouge, Louisiana.

TABLE 3.1-5

CONCENTRATIONS OF PHENOLIC COMPOUNDS IN THE MISSISSIPPI RIVER, 1973-1977

Location	Number of Samples	Range in Concentration, mg/l			Percentage of time values were equal to or less than those shown				
		Maximum	Minimum	Mean	95	90	80	70	60
St. Francisville	110	11	0.0	1.8	7	5	3	2	1
Plaquemine	110	22	0.0	1.8	7	5	3	2	1
Union	113	42	0.0	2.2	7	5	3	2	1
Luling	102	12	0.0	1.9	7	5	3	2	1
Violet	171	73	0.0	2.6	10	6	3	2	1
Venice	113	19	0.0	1.8	7	5	3	2	1

Source: US Army Corps of Engineers, New Orleans District, 1981. Deep-Draft Access to the Ports of New Orleans and Baton Rouge, Louisiana.

docks each year. The port serves midcontinent United States in which area resides about one-third of the nation's population. The port handled 64 million tons of foreign trade in 1977. Coastwise traffic amounted to approximately 16 million tons. At any given time, approximately one of every four barges in the United States is in the New Orleans area. There are about 40 agencies representing over 100 steamship lines offering regular and frequent sailings between New Orleans and ports throughout the world. Twenty-five linear miles of docking facilities are located along both banks of the Mississippi River in this vicinity.

The Port of Baton Rouge, ranking fourth in the United States, handled 25.5 million tons of foreign trade in 1977. Total tonnage amounted to about 70 million tons. Along the stretch of the Mississippi River served by the port are 13 oil refineries with a total storage capacity for petroleum bulk commodities in excess of 23 million barrels.

The contribution of tourism to the economy is substantial, particularly in the Greater New Orleans area. The industry provides about $1.1 billion annually to the economy of the metropolitan area alone. Major attractions in the area include the world-reknown Vieux Carre, Mardi Gras, Spring Fiesta, and Mid-Winter Sports Carnival including the Sugar Bowl. The Superdome, a major sports and convention facility, completed in 1975, along with the Rivergate convention and exposition hall, insure New Orleans' position as a leading tourist and convention center.

3.2 Existing Pits. The existing pits are located in the immediate vicinity of the proposed project site. Therefore, the discussion of affected environment in Section 3.4, Wetland Sites, Including the Proposed Locations, should suffice for this alternative.

3.3 Nonwetland Sites. The major nonwetland areas in the study area (i.e., natural bayou ridges) are not underlain by suitable material (i.e., too high clay content). Nonwetland areas which are underlain by suitable material are the chenier ridges in the marshes (location shown in Figure 3.3-1). Readily mineable sand deposits are shown in Figure 3.3-2. These chenier ridges are located almost entirely on property belonging to the Plaisance interests. The Picciola interests proposed project area does not include any chenier ridges. These chenier ridges comprise approximately 85 acres which are accessible without a Department of the Army permit; however, a Coastal Use permit from the Coastal Zone Management Section of the Louisiana Department of Natural Resources is required in order to dredge the cheniers in the project area.

3.3.1 Significant Resources.

3.3.1.1 Agriculture. Chenier ridges in the project area are not utilized for agricultural purposes.

3.3.1.2 Fisheries. The cheniers themselves would not be expected to support fisheries resources (except in isolated ponds).

3.3.1.3 Wildlife. Because of the relatively small areal extent of the chenier ridges compared to the surrounding marsh, the absolute numbers of individuals

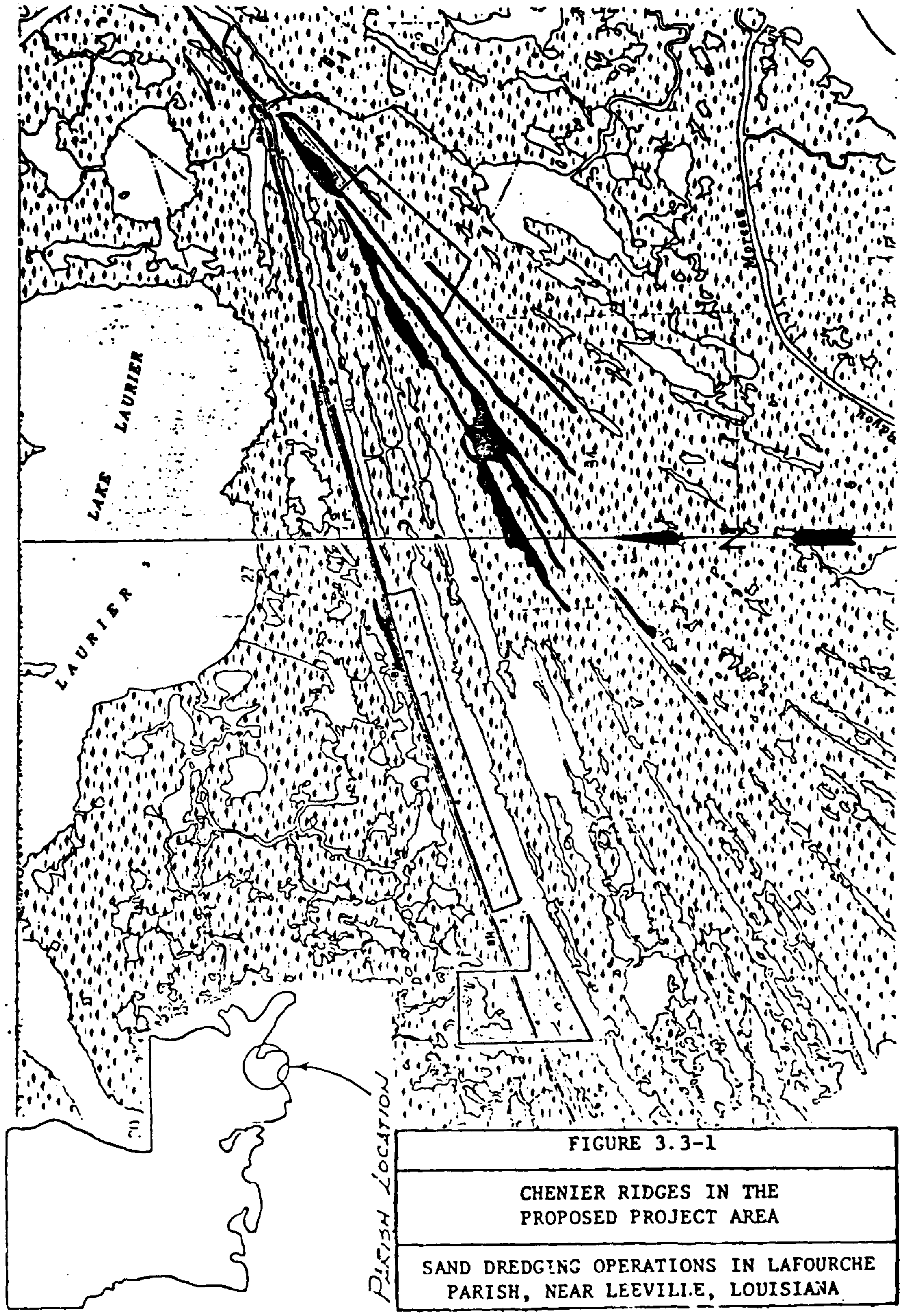
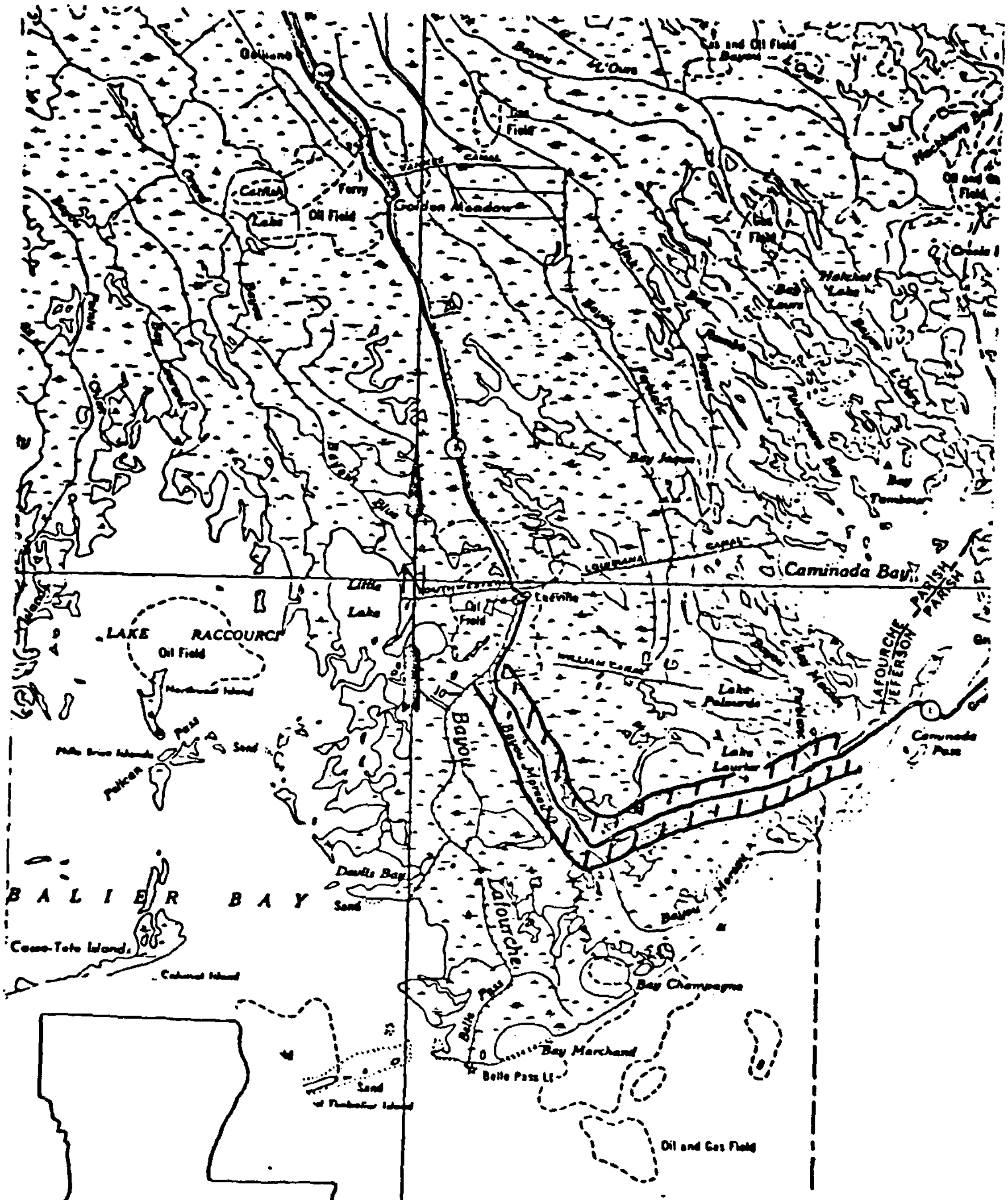


FIGURE 3.3-1

CHENIER RIDGES IN THE PROPOSED PROJECT AREA

SAND DREDGING OPERATIONS IN LAFOURCHE PARISH, NEAR LEEVILLE, LOUISIANA

SOURCE: U.S.C. & G.S. SCALE: 1" = 2652'



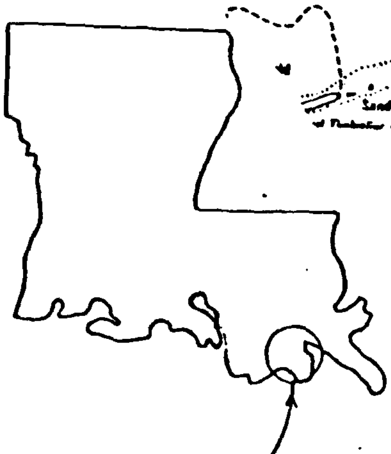


FIGURE 3.3-2

LOCATION OF SAND DEPOSITS WHERE MINING IS READILY FEASIBLE

SAND DREDGING OPERATIONS IN LAFOURCHE PARISH, NEAR LEEVILLE, LOUISIANA

SOURCE: USC & GS

SCALE: 1" = 7 MILES

of any economically-important wildlife species are not great. However, because of the kind of habitat these areas provide in the marsh, they are extremely valuable wildlife habitat. Wildlife species of economic importance which would be expected to utilize these areas include nutria, mink, squirrels, and possibly American alligator.

3.3.1.4 Energy. No known energy production locations are located on the subject chenier ridges.

3.3.1.5 Recreation. The cheniers provide opportunities for both passive and active recreation. Hunting and trapping are possible in these areas and the higher elevations of these ridges provide campsites. Bird watching and other wildlife observation are also possible on the cheniers. However, these areas are largely under private ownership and public access is prohibited.

3.3.1.6 Navigation. Not applicable.

3.3.2 Environmental Setting.

3.3.2.1 Vegetation. The chenier ridges, in contrast to the surrounding marshes, are generally wooded. Live oak is the major dominant species of the cheniers in the project area. Tree species which inhabit the cheniers are listed in Table 3.3-1 and other plant species are listed in Table 3.3-2.

3.3.2.2 Fauna.

3.3.2.2.1 Fisheries. The cheniers themselves would not provide any direct fishery habitat, except in isolated ponds and depressions. However, significant amounts of detritus and other organic nutrients may be exported from the chenier by abnormally high tides and storm water runoff. This detritus would be utilized as part of the foundation for the marsh ecosystem, thus helping to support local fish populations.

3.3.2.2.2 Wildlife. The cheniers support a diverse avifauna. Among the species of birds utilizing these cheniers for feeding, resting, or nesting areas are various species of migrant and resident passerine, wading and shore birds, and waterfowl, as well as raptors and other types of birds. A list of bird species observed in the study area is included at Appendix B.

Game and furbearing mammals can be found in the marshes, swamps, and forests in the Barataria Basin. The forests provide habitat for white-tailed deer, gray squirrels, and rabbits. Deer and rabbits also live in marshes and swamps. The furbearers include opossum, nutria, northern raccoon, Nearctic river otter, common muskrat, and North American mink. Some of these occur at the site of the proposed project and throughout the wetland areas and in forests and fields.

Nongame mammals which occur in the Barataria Basin and may be found are the southeastern myotis (*Myotis australoriparius*), eastern pipistrelle (*Pipistrellus*

TABLE 3.3-1

TREE SPECIES COMPOSITION OF CHENIERS IN COASTAL LOUISIANA

Scientific Name	Common Name
Quercus virginiana	Live oak
Celtis laevigata	Hackberry
Ulmus americana	American elm
Acer drummondii	Swamp maple
Taxodium distichum	Cypress
Gleditis triacanthos	Honey locust
Zanthoxylum clava-herculis	Hercules-club
Diospyros Virginiana	Persimmon
Quercus nigra	Water oak

Source: A. W. Palmisano, 1970. Plant community-soil relationships in Louisiana coastal marshes. Ph. D. dissertation Louisiana State University, Baton Rouge, Louisiana.

TABLE 3.3-2

PLANT SPECIES COMPOSITION OF CHENIERS IN THE PROJECT AREA

Scientific Name	Common Name
Ambrosia artemisiifolia	Ragweed
Baccharis halimifolia	Eastern baccharis
Cirsium sp.	Thistle
Cyperus sp.	Sedge
Fern	Fern
Ilex vomitoria	Yaupon
Ipomoea sp.	Morning glory
Iva frutescens	Marsh elder
Kosteletzkya virginica	Saltmarsh mallow
Mikania scandens	Climbing hempweed
Myrica cerifera	Wax myrtle
Panicum virgatum	Switchgrass
Passiflora incarnata	Passion flower
Persea Borbonia	Red bay
Phytolacca americana	Polkweed
Polygonum sp.	Smartweed
Quercus virginiana	Live oak
Rhus radicans	Poison ivy
Sambucus canadensis	Common elderberry
Sabal minor	Palmetto
Salix nigra	Black willow
Sesbania drummondii	Rattlebush
Sesbania macrocarpa	Hemp sesbania
Solanum pseudocapsium	Jersualem cherry
Solidago sp.	Golden rod
Vicia angustifolia	Narrow-leaved vetch
Vicia dasycarpa	Purple vetch
Vigna repens	Dear pea

Source: Gosselink and Monte, 1974. Louisiana Offshore Oil Port, Environmental Baseline Study, vol. IV

subflavus), red bat (Lasiurus borealis), seminole bat (Lasiurus intermedius), evening bat (Nycticeius humeralis), nine-banded armadillo (Dasypus novemcinctus), marsh rice rat (Oryzomys palustris), fulvous harvest mouse (Reithrodontomys fulvescens), white-footed mouse (Peromyscus leucopus), cotton mouse (Peromyscus gossypinus), hispid cotton rat (Sigmodon hispidus), eastern wood rat (Neotoma floridana) and Atlantic bottle-nosed dolphin (Tursiops truncatus).

Reptile and amphibian species found on the chenier ridges include a few American alligators (Alligator mississippiensis), green anole (Anole carolinensis carolinensis), ground skink (Scinella laterale), speckled kingsnake (Lampropeltis getulus holbrook), western cottonmouth (Agkistrodon piscivorous leucostoma), eastern yellow-bellied racer (Coluber constrictor flaviventris), and Southern leopard frog (Rana pipiens spenocephala) (Mabie, 1974).

A number of threatened and/or endangered animal species occur or have been known to occur in Louisiana. These species include the Southern bald eagle (Haliaectus leucocephalus), peregrin falcon (Falco peregrinis), Bachman's warbler (Vemivora bachmani), brown pelican (Pelecanus occidentalis), and American alligator (Alligator mississippiensis). Of these species, only the American alligator, which is listed as threatened due to similarity of appearance in Lafourche Parish, would be expected to utilize the chenier ridges for permanent habitat. However, the marshes of this area are generally considered too saline to provide good alligator habitat.

3.3.2.2.3 Water Quality. The only water found on the cheniers would be in depressions and ponds which would be replenished by abnormally high tides and precipitation. The cheniers would have an effect upon water quality in adjacent areas. They would tend to prevent or decrease the rate of salinity intrusion from the Gulf to more inland waters. Storm water runoff would be filtered through the sand and vegetation of the chenier prior to its entering the marsh.

3.3.2.2.4 Wildlife Management Areas. The State of Louisiana maintains the Wisner Wildlife Management Area in lower Lafourche Parish, which is located within a short distance of the chenier ridges under consideration.

3.3.3 Socioeconomic.

3.3.3.1 Archeological Sites. There are several archeological sites near the chenier ridges under consideration. These sites are all Indian middens. The locations of these sites are along the natural ridge of Bayou Thunder and not on the cheniers themselves.

3.3.3.2 Historical Sites. There are no known historical sites on or near the chenier ridges under consideration (Figure 3.3-3).

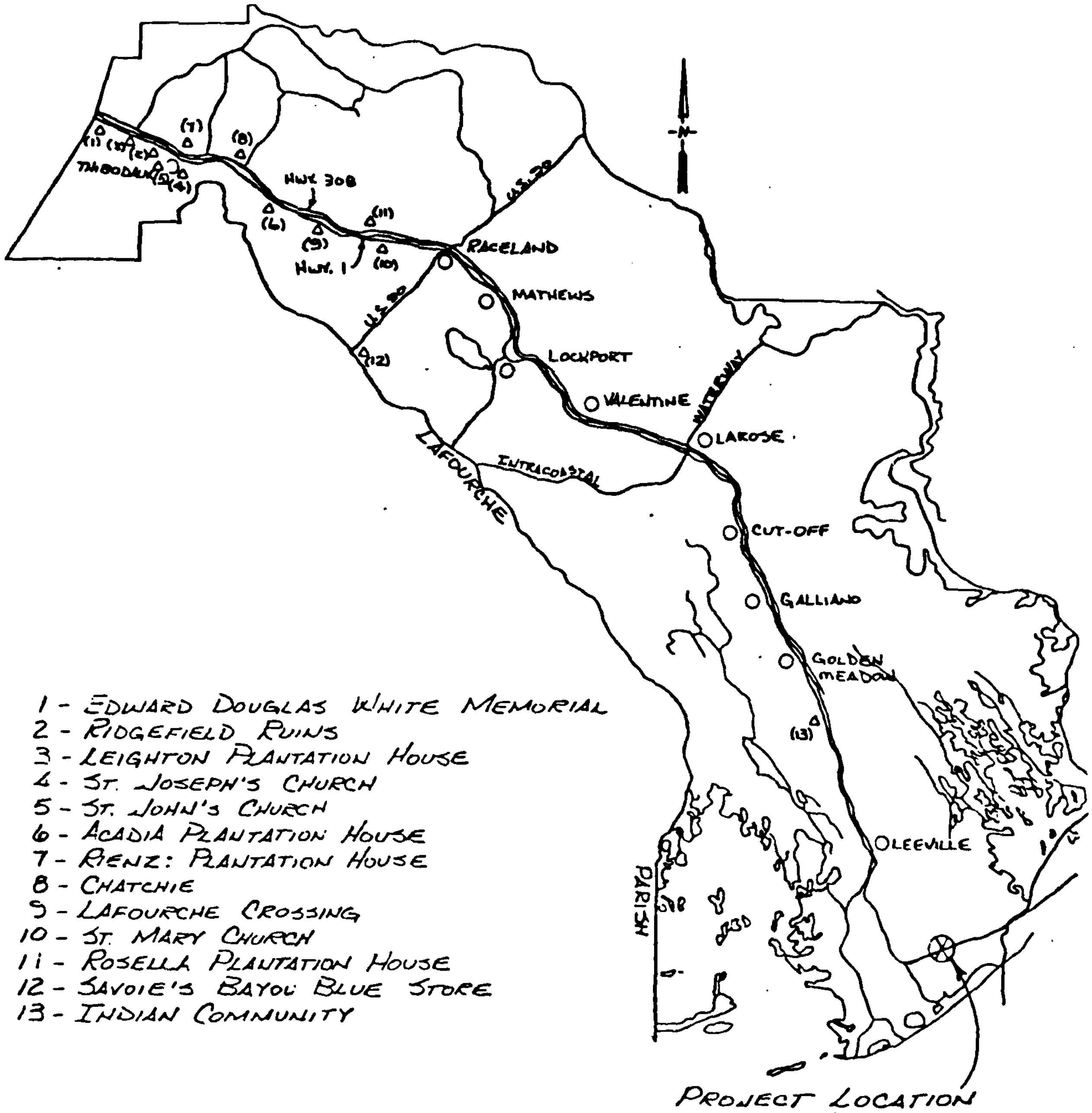


FIGURE 3.3-3

SITES WITH HISTORICAL, COMMEMORATIVE OR PRESERVATIONAL SIGNIFICANCE

SAND DREDGING OPERATIONS IN LAFOURCHE PARISH, NEAR LEEVILLE, LOUISIANA

SCALE: 1" = 17 MILES

3.3.3.3 Economy. The chenier ridges are, in this subject area, undeveloped. There are a few camps on some of the ridges, however, there are no commercial or industrial developments. There are a few existing sand pits in operation on some of the cheniers. These pits provide the only known employment on the chenier ridges. There is little, if any, commercial hunting or trapping on the cheniers, as their total areal extent is not great enough to support such activities.

3.4 Wetland Sites, Including the Proposed Locations. The marshes of the study area are extensive and fairly homogeneous. Within the study area, one wetland location, with suitable access to highways and a suitable quality and quantity of sand, is generally similar as to resources and setting as any other site. The following discussion, therefore, is for all possible wetland sites, including the proposed sites. The proposed project locations are indicated in Figure 3.4-1. The location of the proposed projects in relation to surrounding parishes is shown in Figure 3.4-2.

3.4.1 Significant Resources.

3.4.1.1 Agricultural. There is no agricultural activity in the marshes of the project area.

3.4.1.2 Fisheries. Louisiana ranked number one among the states in commercial fish landings in 1979 with a total catch of about 1.5 billion pounds and an ex-vessel value of $198.5 million, which ranked third (National Marine Fisheries Service, 1980a). It should be noted that the total actual economic values of these fishery landings are 2 to 4 times greater than the ex-vessel values (Penn, 1973, and Jones 1974). In addition, over 22 million fish were landed in 1979 in Louisiana by recreational fishermen (National Marine Fisheries Service, 1980b). These large catches are due in part to the vast areas of coastal wetlands in the state.

Within the general project area, the port of Golden Meadow-Leeville was one of the top commercial fishery ports in the US in 1979. This port ranked 39th among commercial fishing ports in quantity of catch and 20th in value of catch in 1979 (National Marine Fisheries Services, 1980a).

3.4.1.3 Wildlife. Nutria and muskrat are the main species which are commercially harvested in Lafourche Parish, but other furbearers include raccoon, mink, otter, and opossum. During the 1973-74 season, there were 432 trapping licenses sold in Lafourche Parish. Lafourche Parish was one of the parishes in which alligator hunting was permitted during 1979. However, there are no permits to kill alligators issued for areas below the 10 parts per thousand isohaline line. The site of the proposed projects is below this line, therefore, no alligators were hunted or taken in this area. Indeed, it is unlikely, though possible, that alligators even inhabit the marshes of or around the proposed site.

3.4.1.4 Energy. Lafourche and Terrebonne Parishes rank in the top four mineral producers in Louisiana, which ranks second among the states. There is

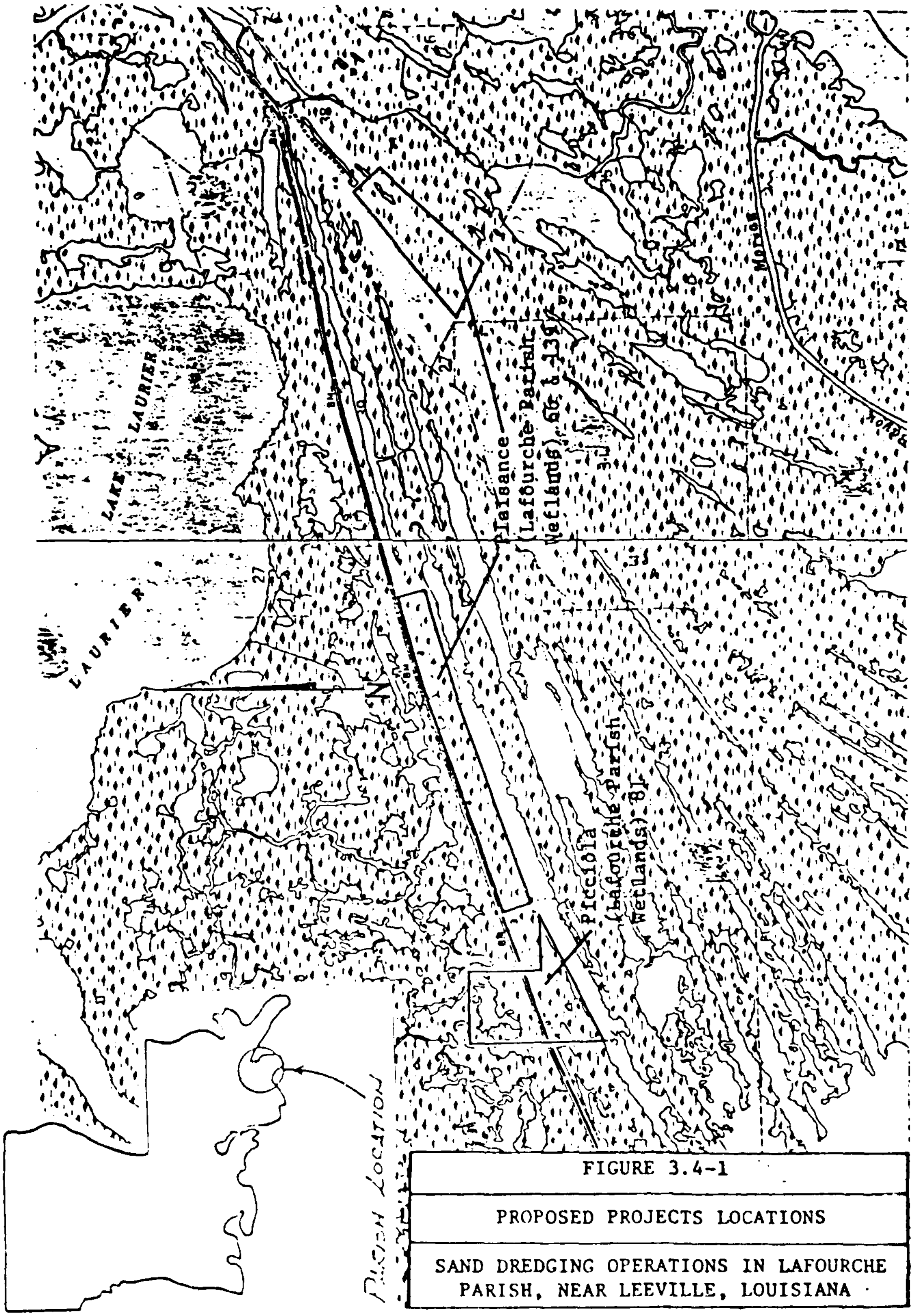


FIGURE 3.4-1

PROPOSED PROJECTS LOCATIONS

SAND DREDGING OPERATIONS IN LAFOURCHE PARISH, NEAR LEEVILLE, LOUISIANA

SCALE: 1" = 2652'

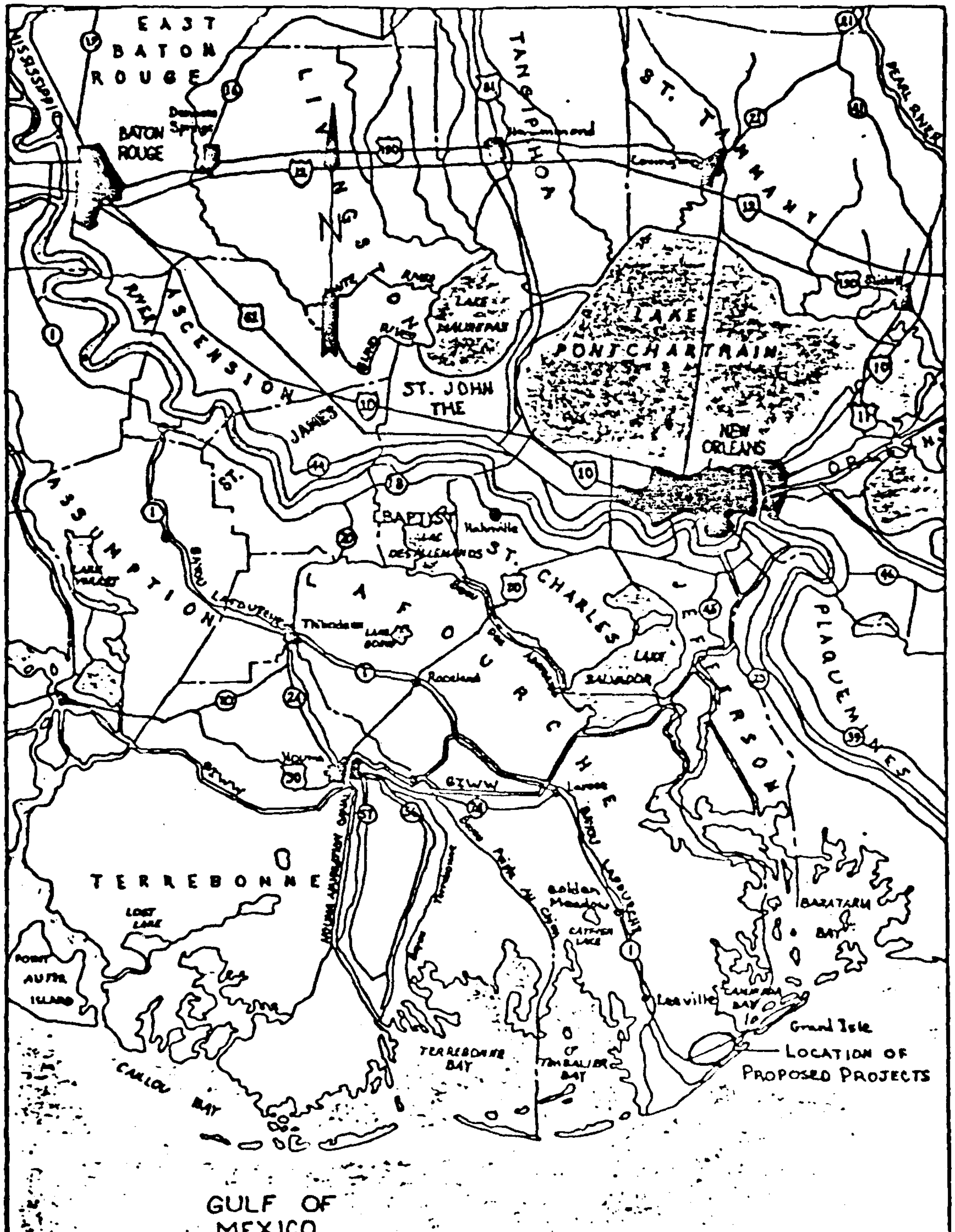


FIGURE 3.4-2

AREA OF PROPOSED PROJECTS

SAND DREDGING OPERATIONS IN LAFOURCHE PARISH, NEAR LEEVILLE, LOUISIANA

SCALE : 1" = 20 MILES

a great amount of petroleum exploration in these parishes, much occurring in wetlands areas. There are no active oil or gas wells at or near the site of the proposed projects (Figure 3.4-3).

3.4.1.5 Recreation. Due to the large amount of marsh and estuarine area in Lafourche Parish, the main recreational activities are water-oriented, including fishing, hunting waterfowl, and boating. During the 1974-75 season, 6,490 resident fishing licenses were sold in Lafourche Parish. Many saltwater sportfish species are abundant, while largemouth bass and other sunfishes are popular with freshwater fishermen. Others participate in recreational fishing for crawfish, shrimp, and blue crabs. During the same year, 7,034 resident hunting licenses were sold in Lafourche Parish, with waterfowl and rabbits being the most popular game. There are several recreational areas throughout the parish (Figure 3.4-4), including a state park, boat launching areas, municipal parks, a national and scenic river (Bayou Des Allemandsa), two wildlife management areas, campgrounds, and playgrounds.

3.4.1.6 Navigation. There are no known navigation channels in the areas under consideration.

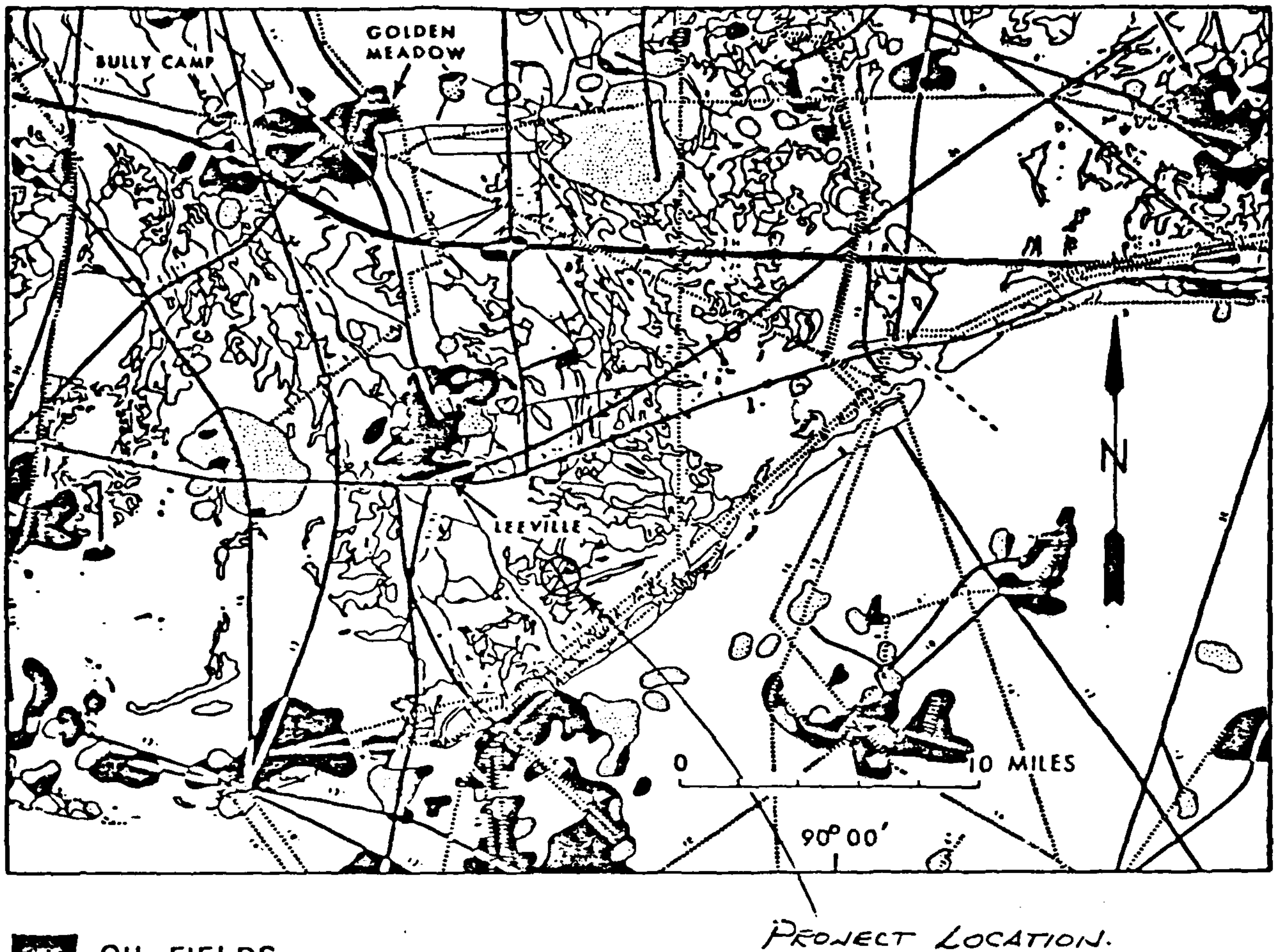
3.4.2 Environmental Setting.

3.4.2.1 Vegetation. The vegetational pattern of Lafourche Parish, as well as that of the Barataria Basin, is influenced mainly by salinities in the marshland areas, and by the slight elevations above the water table provided by the ridges along bayous. The proposed project sites are in the midst of a brackish to saline marsh, miles away from any other types of dominant vegetation. A study was made of an area immediately adjacent to the project site in 1974, by Gosselink and Monte (1976), while vegetation studies have been made of the Barataria Basin by Chabreck (1972), Day et al. (1973), and by Bahr and Hebrard (1976).

The proposed project sites are part of a large area of marshland habitat. The coastal marshes of Louisiana have been subdivided into four types -- fresh, intermediate, brackish, and saline -- which are distinguished by the occurrence of certain salinity regimes. According to Chabreck (1972) and based upon prevailing salinities, the project site is generally characterized as a brackish to saline marsh. The proposed project sites include about 159 acres of marsh and 21 acres of open water (based upon USGS 7 1/2-minute quadrangle maps of the area).

The brackish marsh in the Barataria Basin has an average salinity of 9.68 ppt (Chabreck, 1972) which may fluctuate rapidly due to tidal influences. Saltgrass and wiregrass are two common plants in the project area, but other species include oystergrass, dwarf spikerush, three-cornered grass, and black rush.

The vegetation of these wetlands provides a very productive basis for the food chain of the area. Specific fauna utilize portions of the vegetation directly. Vegetative material not directly utilized eventually enters the food chain in the form of detritus.



SOURCE:
GAGLIANO et al, 1973

FIGURE 3.4-3
OIL AND GAS FIELD LOCATIONS
SAND DREDGING OPERATIONS IN LAFOURCHE PARISH, NEAR LEEVILLE, LOUISIANA

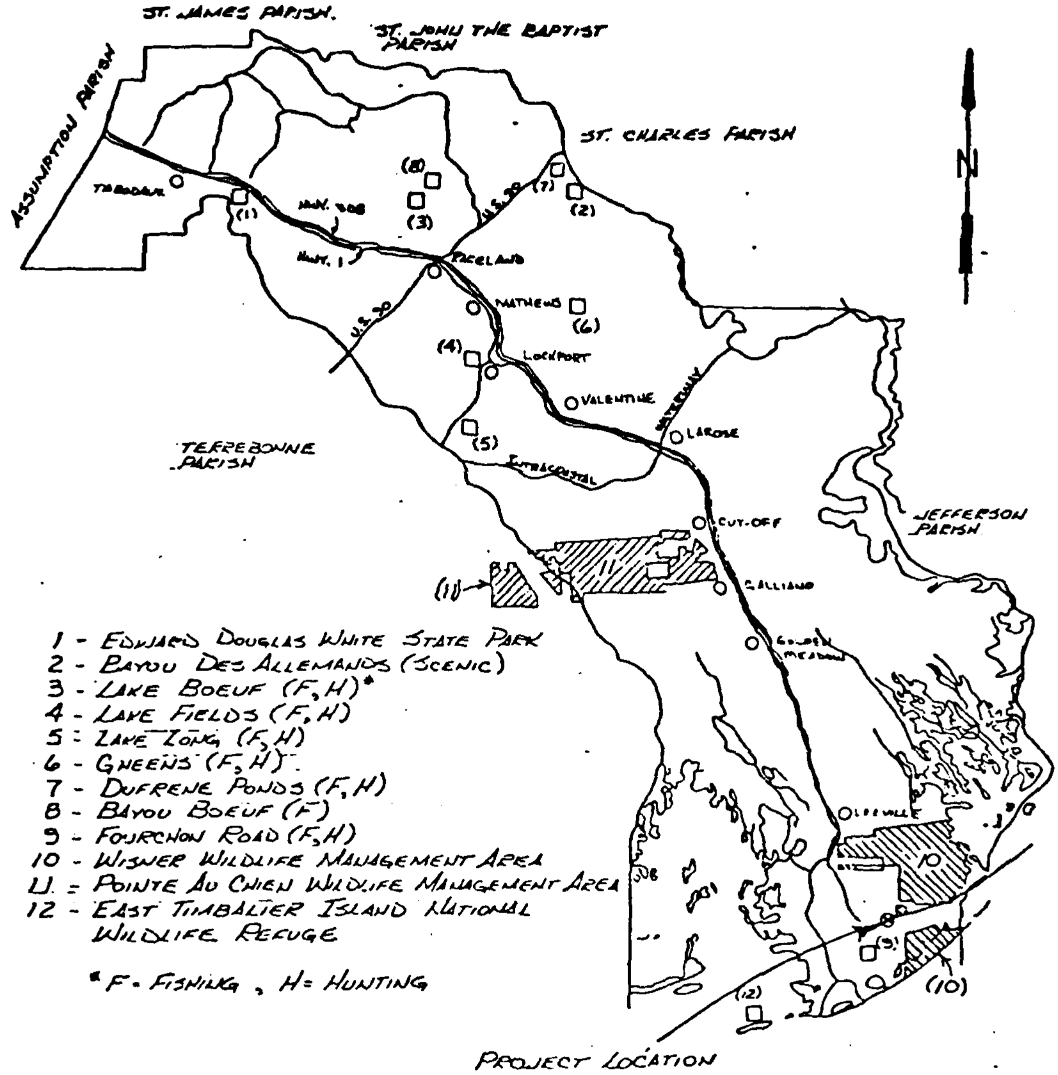


FIGURE 3.4-4

RECREATIONAL AREAS

SAND DREDGING OPERATIONS IN LAFOURCHE PARISH, NEAR LEEVILLE, LOUISIANA

SCALE: 1" = 21 MILES

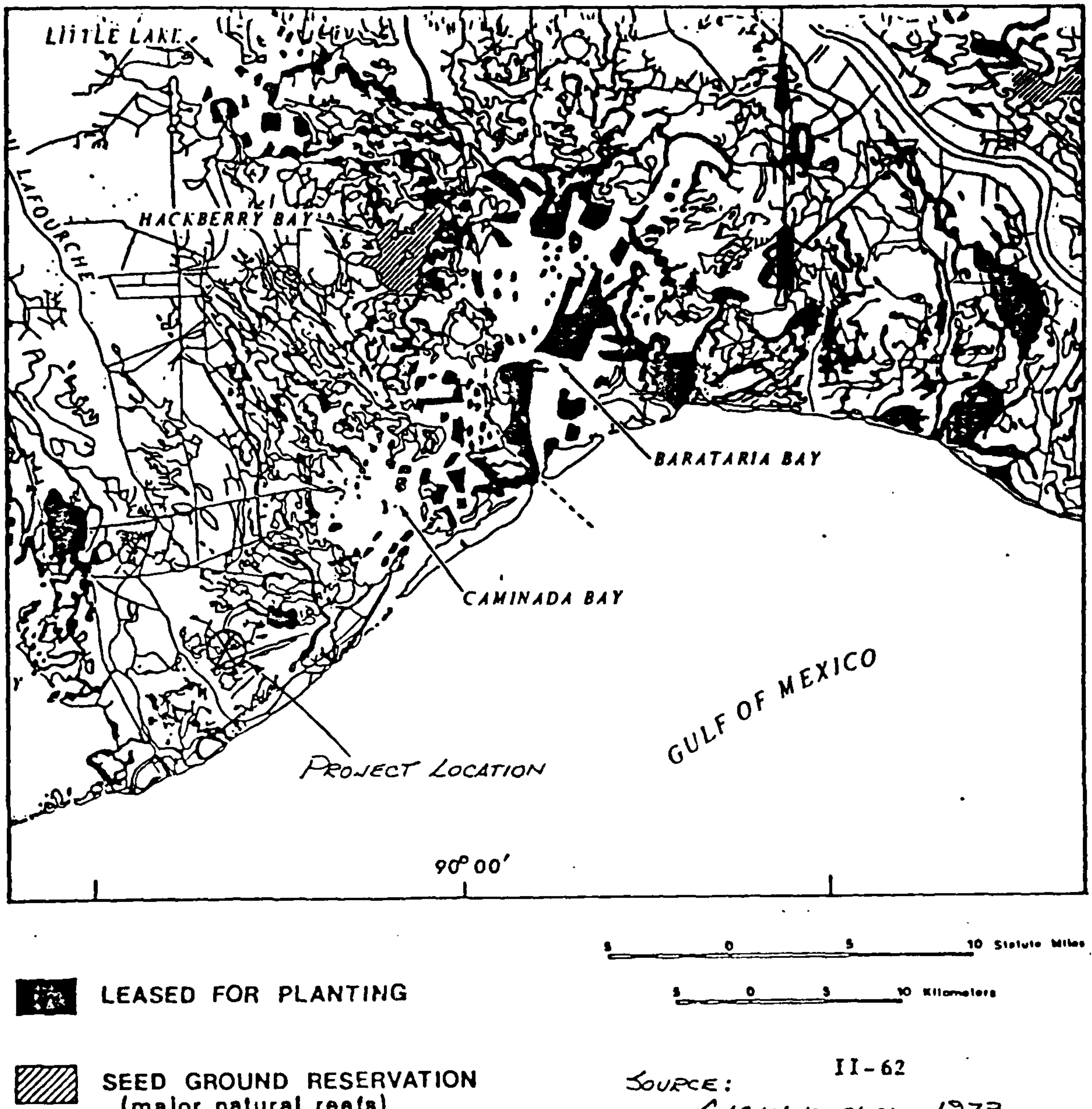
In addition to food chain functions, the vegetation in these wetlands provide cover for a number of uses by various fauna. Aquatic fauna may utilize these marshes for spawning, feeding, resting, rearing, and general shelter. Many avifauna nest, rear their young, rest, feed, and seek protective shelter in these marshes. Certain terrestrial and amphibious fauna similarly utilize the habitat furnished by the vegetation of the wetlands of the proposed project area.

The vegetation of the project area wetlands serves to shield inland areas from storm tides. This shielding action is a result of increased friction between the water and vegetation; the vegetation absorbs some of the energy of the storm surge. The roots of the vegetation in these wetlands serve to hold the soil in place, thus reducing the rate of erosion in the area.

The wetlands of the proposed project area would serve to purify water. This function would be performed actively by direct absorbtion by the plants and passively by the plants providing habitat for Aufwuichs (all of the organisms that are attached to, or move upon, a submersed substrate, but which do not penetrate into it) which serve to remove organic and inorganic particles from the water.

3.4.2.2 Fauna. The area immediately adjacent to the proposed project site was sampled for fish and shellfish during August and September 1974, using a seine and a trawl (Loesch, 1976). These studies revealed that at least 29 different species were common inhabitants (Appendix C contains a comprehensive list of species found). No freshwater species were found in the area, since salinities ranged from 8 to 24 ppt; however, several of the freshwater species listed in Appendix C may occur *in estuarine waters*. Standing crops of all species collected by trawl averaged 8.6 g/m^2 in August, and 2.0 g/m^2 in September, while seine samples yielded 6.8 g/m^2 in August, and 1.1 g/m^2 in September. Loesch attributed the decrease in standing crops to high waters and disturbance caused by Hurricane Carmen on 7 September 1974. The most commonly occurring fish species in this study were bay anchovy, spotted seatrout, sheepshead minnow, gulf killifish, and tidewater silversides. A total of 69 different species were found in salt marsh environments in other areas near to the proposed project (Loesch, 1976). Fish species found in the salt and brackish marsh areas in the Barataria Bay area are listed in Appendix C. Many other species are found throughout the Barataria Basin. Several fish found in the estuarine areas are commercially harvested, including seatrout, drum, Gulf menhaden, Atlantic croaker, mullet, shad, flounder, kingfish, and spot. Some of these and others are important commercial fishes. Periodic high water levels have caused existing borrow pits to become stocked with several species. Sport fishermen are regularly seen fishing for seatrout, drum, and other species in these pits.

The Barataria Basin provides abundant commercial catches of brown shrimp, white shrimp, oysters, and blue crabs. These and many other aquatic invertebrates are important food items for fishes. Shrimp and crabs are common in watered areas of the project area, and oysters are abundant in the marsh of the surrounding area (Figure 3.4-5).



SOURCE:
GAGLIANO et al, 1973

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FIGURE 3.4-5
OYSTER GROUNDS
SAND DREDGING OPERATIONS IN LAFOURCHE PARISH, NEAR LEEVILLE, LOUISIANA

Bahr and Hebrard (1976) list 216 bird species that may occur in the Barataria Basin, either permanently, on a seasonal basis, or while resting during migration. Mabie (1976) reported on a 1972 study conducted on a chenier area adjacent to the proposed project site, which found a total of 69 species of birds with population density varying from 15 to 0.07 birds/100m^2. The mean number of birds per day was 2.12/100m^2 for a 51-day period between March and May 1972. The habitat is used primarily as resting and feeding area with nesting by some species. Wading birds are especially common on and around the project site. A list of avifauna observed in the project area may be found in Appendix B.

Wood duck, bobwhite quail, the American woodcock, and mourning dove are game birds that live in forests of the project area. Migratory waterfowl which inhabit the marshes of the project area include the snow goose; ducks (mallard, gadwall, northern pintail, green-winged and blue-winged teal, American wigeon, northern shoveler, redhead, ring-necked duck, canvasback, greater and lesser scaup, goldeneye, bufflehead, and red-breasted merganser); and Virginia rail, sora, purple gallinule, coot, and common snipe. Permanent residents of the marshes include the mottled duck, king rail, clapper rail, and common gallinule. Some of the above-mentioned game birds occasionally occur at the site of the proposed project.

Many nongame birds are permanent residents of swamps and forests in the project area. They include the American anhinga, several egrets and herons, ibises, vultures, hawks, owls, the kingfisher, woodpeckers, wrens, shore birds, gulls, terns, and several songbirds.

Mammals are discussed in Section 3.3.2.2.

Mabie (1974) conducted a study of the salt marsh and chenier habitats located in the proposed project area. The Gulf coast toad (Bufo valliceps) and the Gulf salt marsh snake (Natrix fasciata clarki) were the only species found in the salt marsh; however, the salt marsh diamondback terrapin (Malaclemys terrapin) is common and probably occurs in the area. (Alligator mississippiensis), green anole (Anole carolinensis carolinensis), ground skink (Scinella laterale), speckled kingsnake (Lampropeltis getulus holbrook), western cottonmouth (Agkistrodon piscivorous leucostoma), eastern yellow-bellied racer (Coluber constrictor flaviventris), and southern leopard frog (Rana pipiens sphenocephla) may also occur in the area.

The bald eagle, brown pelican, and peregrine falcon are species present in the Barataria Basin which are on the list of endangered species (Federal Register, 20 May 1980, Vol.45, No.99. The American alligator, which is abundant in the basin, has been classified as a threatened by similarity of appearance species in that part of coastal Louisiana in which the proposed site is located.

Southern bald eagles usually build their nests in tall trees along a shore or natural levee ridge in wetland areas. Fish is a principal part of their diet. For this reason, they often range into marsh and estuarine areas searching for food. Surveys conducted in 1972 found only 48 individuals in Louisiana. Once abundant, their diminished numbers have been blamed on pesticides (Lowery, 1974). In the spring of 1976, only eight active eagle nests were found in Louisiana, located in Terrebonne, Jefferson, St. Charles, and Assumption Parishes. The nearest nests are located about 33 miles north of the project area.

Resident brown pelicans maintained breeding colonies along the Louisiana coastline until 1956, when many pelicans died, and very little reproduction occurred among the remaining pelicans. These problems were caused by the chlorinated pesticide, endrin, which was present in the fish which the pelicans ate. Nesting of native Louisiana pelicans has not occurred since 1962. Since that year, the Louisiana Wildlife and Fisheries Commission has imported brown pelicans from Florida in an attempt to reestablish resident breeding populations. Although successful breeding has occurred in Queen Bess and Grande Terre Islands (about 15 miles northeast of the project area), more die-offs occurred in 1975, again due to high levels of endrin.

The peregrin falcon occasionally ranges into the study area, but does not breed in the Barataria Basin. It, like the southern bald eagle and brown pelican, has diminished in numbers due to pesticides.

The American alligator is abundant in the marshes of coastal Louisiana, except in the saline marshes. It is present in the vicinity of the project area, but prefers fresher waters. Special seasons for their commercial harvest were opened in Cameron, Vermilion, and Calcasieu Parishes in 1975, 1976, and 1977. It has been preliminarily determined that the proposed project would not jeopardize the continued existence of the American alligator.

3.4.2.3 Water Quality. The waters and sediment of the project area have been studied on three occasions. In 1974, Ho and Blanchard studied water and sediment chemistry for the Louisiana Offshore Oil Port study. The applicants for the proposed project commissioned studies in 1978 and 1979. Most of the parameters reported in these studies were similar. EPA guidelines for mercury (Hg), lead (Pb), cadmuim (Cd), and chromium (Cr) were exceeded. Although there is evidence from other studies that elutriate levels of these metals from many pristine marsh soils are high in Louisiana, no evidence has been found that values encountered here are typical, or that significant food chain enrichment will not occur as these metals become elements of the trophic system. Chemical oxygen demand values were fairly high. There was very little evidence of pesticide presence, all values for these parameters being less than 1 ppb. Values obtained, methods used, and a more detailed account of the three studies mentioned is in Appendix D, and a tabular summary is provided in Table 3.4-1.

3.4.2.4 Wildlife Management Area. The Wisner Wildlife Management Area, which is operated by the Louisiana Department of Wildlife and Fisheries, is located a short distance to the northeast of the proposed location.

TABLE 3.4-1

SUMMARY OF WATER QUALITY STUDIES

PARAMETER	EPA (1980) PROTECTION OF MARINE LIFE	1974[1]	1978[2] Filtered/Standard water/Elutriates		1979[3]	
Organic-N		0.30				
Ammonia-N		0.06				
Nitrate and Nitrite-N		0.07				
Phosphate-P		0.15				
Organic-P		0.05				
Diss SiO_2		4.07				
DO		10.43	9.4/-		9.7	
BOD		6.82	3/13.5		9.5	
COD			1345/1375		1430	
TKN			1.44/-		1.0	
Total Coliforms			132/-		14,005	
Mercury	0.00010		0.118/0.131	***	<.005	**
Lead	0.025		0.097/0.111	***	<.1	**
Arsenic	0.508		0.012/0.013		<.11	
Cadmium	0.0045		0.021/0.021	***	0.05	***
Copper	0.0040		0.014/0.017	***	0.038	***
Chromium	0.018		0.113/0.121	***	0.0425	***
Nickel	0.0071		0.011/0.012	***	<.05	**
Zinc	0.058		0.041/0.043		0.0425	

Table 3.4-1 continued.

PARAMETER	EPA (1980) PROTECTION OF MARINE LIFE	1974[1]	1978[2] Filtered/Standard water/Elutriates	1979[3]
Aldrin	1.3		*	*
Chlordane	0.004		* **	* **
DDD			*	*
DDE			*	*
DDT	0.001		* **	* **
Dieldrin	0.0019		* **	* **
Endrin	0.0023		* **	* **
Ethion			*	*
Heptachlor	0.0036		* **	* **
Heptachlor epoxide			*	*
Lindane	0.16		* **	* **
Malathion	0.01		* **	* **
PCB	0.030		* **	* **
Toxaphene	0.070		* **	* **

*** - Exceeds EPA Marine Criteria
** - EPA Criteria lower than detection limits used in study
* - Not detected at 1 mg/l level of detection

1 September 1974 Ho and Blanchard, average values for water column
2 May 1978 mean water column/elutriate data collected by R. H. Kilgen
3 March 1979 mean values of data collected by Southern Petroleum Laboratories, Inc.

3.4.3 Socioeconomic.

3.4.3.1 Archeological Sites. Studies were made of the general area by McIntire (1976) during 1973 and 1974, and an onsite inspection was made by an archeologist for the Louisiana Department of Highways on 9 July 1976. Although there are sites located within 1.5 miles to the northeast and 1 mile south of the project site, no sites were found on the proposed project site. The two nearby sites are located on the natural levee of two small bayous. If there are any sites on the proposed project site, they would probably be revealed only through dredging activities.

3.4.3.2 Historical Sites. There are no sites listed on the National Register of Historic Places in the project area.

3.4.3.3 Economic Elements. The geographic area considered in this section of the EIS will be Lafourche Parish. Since the parish is not a Standard Metropolitan Statistical area, very little reliable demographic or economic data is available at the subparish level. Lafourche Parish is in OBERS Water Resources Subarea 0809, and is part of the South Central Planning and Development Commission (Louisiana-Economic Development Administration - District 3), along with Assumption, St. Charles, St. James, St. John the Baptist, and Terrebonne Parishes.

From 1960 to 1970, the population of Lafourche Parish increased by 24 percent, roughly double the rate of growth experienced statewide (11.8 percent) (Table 3.4-2). However, data presented in table 3.4-3 suggests that population

increases for Lafourche Parish will be similar to statewide increases between 1970 and 1990, amounting to about 10 percent per decade.

In 1975, the population density of Lafourche Parish was about 64.2 persons per square mile. Due to historical patterns of settlement along Bayou Lafourche ridge and the location of La. 1, there are few areas in Lafourche Parish which have extremely high population densities. For the most part, except for the small communities, the population is distributed along the west side of Bayou Lafourche from the parish line north of Thibodaux southward to Leeville, with fewer people on the east side of the bayou. Some of the towns and communities and their 1970 populations include (see Figure 3.4-4): Thibodaux (15,028); Raceland (4,880); Lockport (2,398); Larose (4,267); and Golden Meadow (2,681) (Calhoun, 1975). The proposed project area is sparsely settled, due to the marshland being unsuitable for residential use.

Table 3.4-4 shows that about 34.5 percent of Lafourche Parish is vegetated wetland, and about 47.8 percent is water. This means that over 82 percent of the parish is not suitable for human habitation. Less than 1 percent of the parish is being used for residential purposes. The site of the proposed project is in a very sparsely settled area, due to the surrounding marshes. Most of the population of the parish lives in strip and clustered settlements, located along Bayou Lafourche ridge. Urban and built-up land account for less

TABLE 3.4-2

Population Data,
Lafourche Parish, Louisiana

Year	Population	Change in 10 years No.	%
1810	1,995	----	--
1820	3,748	1753	88
1830	5,530	1755	47
1840	7,303	1800	33
1850	9,532	2229	47
1860	14,044	4512	47
1870	14,719	675	5
1880	19,113	4394	30
1890	22,095	2982	16
1990	28,882	6787	31
1910	33,111	4229	15
1920	30,841	-2270	-7
1930	32,419	1578	5
1940	38,615	6196	19
1950	42,209	3594	9
1960	55,381	13172	31
1970	68,941	13560	24
1975*	72,715	----	--

Sources: Calhoun, 1975.
*Segal *et al.*, 1976.

TABLE 3.4-3

Population Growth and Projection Comparisons

Area	1960	1970	1980	1990
United States 1/	179,323,175	203,211,926	223,532,000	246,039,000
Louisiana 2/	3,257,022	3,641,306	3,989,432	4,361,426
Sub-Area 0809 3,4/	1,121,838	1,309,174	1,383,900	1,481,400
Louisiana District #3 2/	192,170	237,740	268,660	305,680
Lafourche Parish 2/	55,381	68,941	76,527	84,759

1/ US Department of Commerce, 1974. (OBERS Projections)

2/ Segal et al., 1976.

3/ Mississippi Delta Water Resources Sub-Area 0809.

4/ US Department of Commerce, 1970.

TABLE 3.4-4

Land Use in Lafourche Parish - 1972

Land Use Category	Acres	%
Urban and built-up land	(106,951)	(7.8)
Residential	2,964	0.2
Commercial and services	494	T
Industrial	988	0.6
Extractive	92,131	6.6
Transportation, communication, and utilities	247	T
Institutional	494	0.1
Strip and clustered settlement	9,139	T
Open and other	494	T
Cropland and pasture (Agricultural)	120,783	8.7
Deciduous forest land	3,458	0.2
Wetland	(479,427)	(34.5)
Forested	122,512	8.8
Nonforested	356,915	25.7
Water	(663,936)	(47.8)
Streams and waterways	1,729	0.1
Lakes	58,045	4.2
Reservoirs	5,681	0.4
Bays and estuaries	104,975	7.6
Other	493,506	35.5
Barren land	13,832	1.0
Total	1,388,387	100.0

( ) = Subtotals for major categories.
T = Trace, less than 0.1 percent.

Source: Louisiana State Planning Office, 1975.

than 8 percent of of the parish's total area, while agricultural acitivities take up 8.7 percent. There are relatively few permanent buildings in Lafourche Parish south of the town of Golden Meadow, due to the marshland environment. There are about 10 small, camp-style buildings near the western boundary of the proposed site, six of which are used as residences, while the others are used as recreational camps.

Louisiana produces over 5 percent of the nation's sawtimber, although it has only about 2 percent of the forest land in the United States. There are only 3,458 acres of deciduous forests in Lafourche Parish, most of which are located north of the GIWW. Lafourche Parish has 122,512 acres of forested wetlands, predominantly cypress-tupelo swamps. In 1974, there were 107.3 million cubic feet of softwoods and 144.2 million cubic feet of hardwoods, for a total of 251.5 million cubic feet. In 1973, the only timber removals in Lafourche Parish were about 300,000 cubic feet of hardwoods (Earles, 1975). In 1975, about 1.0 million board feet of sawtimber were harvested in Lafourche Parish, which included 367,614 board feet of cypress; 115,322 board feet of oak; 78,716 board feet of ash; 429,719 board feet of gum; 13,010 board feet of gum; 13,010 board feet of cottonwood and willow; and 11,552 board feet of miscellaneous hardwoods. Only 10 cords of pine pulpwood were harvested. Landowner income from the sale of timber in Lafourche Parish amounted to $38,565 in 1975. Lafourche Parish produced only 0.1 percent of the state's harvest of sawtimber in 1975 (Bobo and Segal, 1977). From these figures, it is apparent that forestry is not a major industry in Lafourche Parish.

In 1980 Louisiana led all states in volume of commercial fishery landings with 1,423.4 million pounds. The state ranked fourth among all states in value of commercial fishery landings. The port area of Golden Meadow-Leeville ranked 37th among major US ports in 1980 in volume of commercial fishery landings with 15.4 million pounds and 31st among major US ports in value of commercial fishery landings with an ex-vessel value of $12,200,000 (National Marine Fisheries Service, 1981). It should be noted that these ex-vessel values are much less than the total economic values.

Recreational fishing is probably the most popular recreational activity in the study area. The average annual worth of the recreational fishing demand in Lafourche and Terrebonne Parishes in 1979 was $6,249,852.25. This figure is based on a demand of 6.71 man-days per capita for fresh/estuarine boat fishing with a unit day value of $3.50 per man-day and a demand of 3.75 man-days per capita for saltwater boat fishing with a unit day value of $12.50 per man-day.

The agricultural industry of Lafourche Parish consists chiefly of surgarcane and cattle production. In 1976, about 50,000 acres were devoted to sugarcane production, with about 37,000 acres being harvested. This acreage was distributed among 148 farms, with about 1,100 landlords sharing in the financial rewards of the harvest. Beef cattle production is the second most important agricultural activity in Lafourche Parish, with farm value of over $2 million in 1976. About 250 cattlemen own an estimated 20,000 head of cattle, which graze on approximately 70,000 acres of open woodland pasture. This land

is usually too low or otherwise unsuitable for sugarcane production. Total agricultural production in Lafourche Parish declined from $40 million in 1974 to $20 million in 1975, and down to $16 million in 1976. This rapid decrease was due to the decline in sugarcane prices. It is predicted that sugarcane acreage will decrease substantially due to declining prices and rising production costs. Soybeans are being considered as an alternative crop by many farmers. Over the last five years, Lafourche Parish has lost between 3,500 to 4,000 acres of agricultural land to other uses, while only about 500 to 600 acres have been converted to agricultural use during the same period. Nearly all lands with soils suitable for agricultural (over 120,000 acres, or 17 percent of the total land in the parish) have been put into production (South Central Planning and Development Commission, 1977). The future of the agricultural industry in Lafourche Parish rests primarily on the possibility that sugarcane prices may increase and thus produce profits, or on the possibility that farmers will switch to soybean production.

Louisiana ranks second in mineral production compared to other states. About 96 percent of the state's mineral production is comprised of crude oil, natural gas, and gas liquids, while the other 4 percent is mainly sulfur and salt. Minerals produced in Lafourche Parish, in order of value during 1973, included petroleum, natural gas, sulfur, natural gas liquid, and sand. Although Lafourche ranks fourth in the state value of mineral production behind Plaquemines, Terrebonne, and St. Mary Parishes, its production declined from $5.15 million in 1970 to $4.40 million in 1973, while the value of mineral production in Louisiana increased from $5.1 million in 1970 to $5.8 billion in 1973. In 1976, there were 1,925 workers in Lafourche Parish, payrolls increased slightly from $43.4 million in 1974-1975 to $43.6 million in 1975-1976 (Bobo and Segal 1977).

US 90 crosses the Lafourche Parish in a general southwest-northwest direction, and crosses Bayou Lafourche at Raceland. La. 1 and La. 308 generally follow Bayou Lafourche, but La. 308 has its southern terminus at Golden Meadow, and La. 1 crosses the bayou at Leeville and goes easterly to Grand Isle. La. 20 cuts across the northern end of Lafourche Parish, while La. 24 leads from Larose in Lafourche Parish, westward into Terrebonne Parish. The proposed project site is located adjacent to La. 1 (see Figure 3.4-1), which is the only overland hurricane evacuation route for residents of Grand Isle and Chenier Caminada.

A section of the Southern Pacific Railroad crosses Lafourche Parish in a general east-west route through Raceland, where a section extends southward to the Valentine community, about 5 miles below Lockport, which is about 35 miles north of the proposed project site. The Texas and Pacific Railroad has tracks on both sides of Bayou Lafourche extending northward from Thibodaux. There is presently an Amtrak station at Schriever, near Thibodaux.

The primary navigable waterways of Lafourche Parish include the Gulf Intracoastal Waterway (GIWW), which provides an east-west route, and Bayou Lafourche, which provides a north-south route. The GIWW crosses Bayou Lafourche at Larose. In 1975, freight transported on the GIWW from the

Mississippi River through Lafourche Parish to Sabine River, Texas, amounted to 56.8 million tons, of which 30.2 percent was crude petroleum; 11.0 percent residual fuel oil; 9.0 percent marine shell; 8.1 percent nonmetallic materials; and 6.4 percent basic gasoline. The major categories of freight on Bayou Lafourche in 1975 included: crude petroleum, 36.5 percent; marine shells, unmanufactured, 26.7 percent; and water, 13.5 percent. Total waterborne commerce on Bayou Lafourche in 1975 amounted to 1.6 million tons, involving 23,429 northbound vessels and 23,433 southbound vessels (US Army Corps of Engineers, 1976). The proposed project site is located about 5 miles east of Bayou Lafourche (see Figure 3.3-2).

Thibodaux Municipal Airport is located in Schriever and provides facilities for small single and twin-engined planes. This airport is located about 56 miles northwest of the proposed project site. There is a helicopter facility along La. 1, located between the project area and Leeville. Commercial seaplanes use Bayou Lafourche, as well as other waterways.

There are several miles of pipeline in Lafourche Parish as a result of the large volume of materials transported by the petroleum industry, but no reliable estimates exist on just how many miles of pipelines are present (see Figure 3.4-3). These pipelines generally range from 4 to 36 inches in diameter for gas transmission lines. These pipelines are generally buried several feet below the surface.

Mineral production, ship building and repair, and seafood processing are the major industries in Lafourche Parish. Mineral production takes place parish-wide, and offshore in the Gulf of Mexico, while shipbuilding and repair facilities are located along Bayou Lafourche and the GIWW. Seafood processing plants are generally located along Bayou Lafourche, from Larose southward. In 1976, there were 3,075 workers employed in manufacturing, compared to 2,200 in 1972, and 1,700 in 1967. The value added by manufacturing was $31.0 million in 1972, an increase of nearly $10 million compared to 1967. There were 64 manufacturing establishments in the parish in 1972 (Bobo and Segal, 1977). Lafourche Parish had 1,209 (36 percent) of the 3,379 business firms in District #3 during 1970 (South Central Planning and Development Commission, 1973).

From 1967 to 1972, the number of wholesale establishments in Lafourche Parish increased from 72 to 97 (34.7 percent), with an increase in sales from $42.3 million to $71.0 million (68.0 percent). The number of employees in wholesale trades increased from 551 to 720 (30.7 percent), with an increase in annual payroll from $2.5 million in 1967 to $4.9 million in 1972 (94.6 percent). During the same 5-year period, statewide increases were as follows: number of establishments, 22.4 percent; sales, 47.6 percent; number of employees, 19.3 percent; and annual payroll, 56.7 percent (Bobo and Segal, 1977).

Between 1967 and 1972, the number of retail establishments in Lafourche Parish increased from 652 to 700, with an increase in sales from $83.3 million to $126.3 million. During the same 5-year period, the number of workers employed

by the retail trade increased from 2,090 to 2,696, with an annual payroll increasing from $7.6 million in 1967 to $12.7 million in 1972. These figures represent increases of 7.4 percent in number of establishments, 29.0 percent in the number of employees, 51.7 percent in retail sales, and 66.4 percent in the annual payroll. In comparison, state increases over the same 5-year period increased as follows: number of establishments, 6.7 percent; number of employees, 19.4 percent; retail sales, 51.6 percent; and annual payroll, 57.0 percent (Bobo and Segal, 1977).

During the 5-year period from 1967 to 1972, the number of establishments in Lafourche Parish increased from 357 to 481 (34.7 percent), and receipts increased from $10.3 million to $16.6 million (61.9 percent). The number of employees increased from 641 to 802 (25.1 percent), while the annual payroll increased from $2.9 million to $4.7 million (55.7 percent).

In comparison, state increases over the same 5-year period were as follows: number of establishments, 38.8 percent; receipts, 115.4 percent; number of employees, 42.8 percent; and annual payroll, 112.9 percent (Bobo and Segal, 1977).

In 1974, there were 22 banking facilities in Lafourche Parish. Educational facilities in the parish included 24 public schools, five private schools, schools for the retarded, and also Nicholls State University, located in Thibodaux. Hospitals are located in Thibodaux, Raceland, and Galliano, with other clinics and health units throughout the parish (Rabalais and Hinkle, 1974).

Nutria and muskrat are the main species which are commercially harvested in Lafourche Parish but other furbearers include raccoon, mink, otter, and opossum. There were 432 trapping licenses sold in Lafourche Parish during the 1973-1974 season.

In 1970, the per capita income for Lafourche Parish was $2,680, compared to $3,090 for the Louisiana average. By 1975, the per capita income for Lafourche Parish, estimated to be about $4,890, was nearly the same as the state average of $4,904 (Bobo and Segal, 1977). Table 3.4-5 presents a comparison of the labor force in various occupations, on a statewide basis, and also in Lafourche Parish, during 1975. There is a large difference in the unemployment rate for Lafourche Parish, which was 3.8 percent, compared to 7.4 percent for the state in 1975. The proportion of workers employed in the various occupational categories were similar when comparing Lafourche Parish with the state.

TABLE 3.4-5

Labor Force, by Occupation
Lafourche Parish and Louisiana, 1975

Occupation	Lafourche Parish No.	Lafourche Parish %	Louisiana No.	Louisiana %
Civilian Labor Force	27,975	----	1,442,000	-
Total Unemployed	1,075	3.8	106,000	7.4
Total Employed	26,900	96.2	1,336,000	92.6
Professional, Technical & Managerial	5,811	20.8	305,831	21.2
Sales	1,417	5.1	90,346	6.3
Clerical and Kindred	2,900	10.4	208,119	14.4
Craftsmen, Foremen & Kindred	4,390	15.7	119,613	13.4
Operations & Other Blue Collar	5,857	20.9	208,511	14.4
Laborers Except Farm	1,978	7.1	81,051	5.6
Farm Workers	972	3.5	42,874	3.0
Services, Including Private Household	3,575	12.8	205,655	14.3

Source: Bobo and Segal, 1977.

4. Environmental Consequences.

4.1 Mississippi River Alternative.

4.1.1 Primary Impacts.

4.1.1.1 Disruption of River Bottom. Sand dredging activities in the Mississippi River would result in the disruption of the river bottom sediments and the destruction or displacement of any benthic organisms. The high sediment load carried by the river would result in any holes dredged in the bottom or batture being refilled within a very short period of time. Once refilled, these disturbed areas would be recolonized by benthic organisms indigenous to the location.

4.1.1.2 Water Quality. Local increases in turbidity for river waters would result from sand dredging activities. This could result in increased water temperature due to absorption of heat by suspended particles. Also, turbidity reduces photic penetration, thus reducing the ability of aquatic green plants to photosynthesize. These effects generally result in a reduction of dissolved oxygen. However, because of high existing turbidity of the river water and the volume and velocity of the current, it is expected that these impacts would be insignificant to the Mississippi River ecosystem at and below the dredging site. Table 4.1-1 reports the results of a study of water quality of the river 100 yards above a maintenance dredging operation and 100 yards below. These data tend to indicate that, other than turbidity increases, water quality parameters quickly return to normal or near normal levels downstream from dredging activities.

Pollutants held in bottom sediments would be resuspended in the water column by dredging activities. These pollutants would probably include heavy metals and pesticides. Water quality is already a problem in this segment of the river with heavy metals concentrations high enough to cause bioaccumulations in fish in excess of Food and Drug Administration guidelines, and a "chemical" or "oily" taste being imparted to fish caught in the area.

4.1.1.3 Damage to Batture. The batture area of the river would be used to deposit sand dredged from the river for dewatering and storage. The effect of this activity would be to destroy all vegetation in the area so utilized and destroy or displace almost all wildlife currently utilizing the area. Upon abandonment of the particular stockpiling site on the batture, spring floods would scour the area and revegetation would eventually return the site to its original condition.

4.1.2 Secondary Impacts.

4.1.2.1 Economic. Because of the distance from the dredging site in the Mississippi River to the sites within the study area (for purposes of this study the study area is Lafourche and Terrebonne Parishes and Grand Isle, Lousiana) where the sand would be used, transportation, storing, and handling

TABLE 4.1-1

WATER QUALITY IMPACTS OF DREDGING IN NEW ORLEANS HARBOR, 1975-76

Parameter	Units	Concentrations: 100 yards Upstream	Effluent	100 yards Downstream
Suspended Solids	mg/l	50.00	12,270.00	142.00
TKN diss	mg/l	0.39	2.74	0.63
Dissolved oxygen	mg/l	7.72	4.81	7.22
Chemical oxygen demand	mg/l	11.10	21.80	10.20
Iron diss	mg/l	7.80	13.00	9.50
Cyanide total	mg/l	2.22	0.004	0.001
Phenols total	ug/l	0.63	7.20	2.00
Arsenic diss	ug/l	2.00	28.30	2.68
Cadmium total	ug/l	1.22	1.60	1.16
Chromium (hexavalent) diss	mg/l	0.00	0.00	0.00
Chromium total	ug/l	10.00	258.00	11.00
Copper total	mg/l	5.67	427.00	7.70
Copper diss	ug/l	4.33	3.20	3.30
Lead total	ug/l	5.22	513.00	7.70
Lead diss	ug/l	0.60	0.11	0.74
Mercury total	ug/l	0.13	0.18	0.11
Mercury diss	ug/l	0.11	0.08	0.09
Nickle total	ug/l	5.78	453.00	5.25
Nickle diss	ug/l	0.00	0.67	0.17
Zinc total	ug/l	34.44	1,203.00	33.2C
Zinc diss	ug/l	6.11	5.37	4.20
Magnesium diss	ug/l	11.85	14.00	12.40
Total Organic Carbon	mg/l	5.57	525.00	6.30

Source: US Army Corps of Engineers, New Orleans District, 1981. Deep-Draft Access to the Ports of New Orleans and Baton Rouge, Louisiana.

costs would significantly increase the cost of Mississippi River sand to consumers. There are basically two methods available to transport the sand from the Mississippi River to the sites of use within the study area, by barges via the Gulf Intracoastal Waterway to an off-loading site and then by truck to the site of use, or by trucks directly to the site. In September, 1981, the estimated minimum cost of sand transported by barge from the Mississippi River at Hahnville to Terrebonne Parish and either off-loaded at a stock-piling site or off-loaded directlly into trucks was $8.00-9.00 per cubic yard. The cost of transporting the sand by truck from the site of off-loading to the site of use also must be considered a part of the total cost of the transportation of river sand by barges, and this cost would vary depending upon the distance from the off-loading site to the site of use. It is estimated tht the total cost of the transportation of Mississippi River sand by barges including the transportation costs from the site of off-loading to the site of use, would be approximately $15.00 per cubic yard. In November, 1981, the estimated minimum cost of sand transported by truck directly from the Mississippi River at Hahnville to sites in Terrebonne and Lafourche Parishes was approximately $9.00 per cubic yard. When these figures are compared to a minimum cost of $3.50 per cubic yard for sand obtained in lower Lafourche Parish and trucked directly to the site of use, the Mississippi River sand costs from 157 to 329 percent more than sand obtained locally in lower Lafourche Parish.

Because sand dredging activities in the Mississippi River are ongoing currently, there would be no impact on employment by continuing utilization of the Mississippi River as a source of sand for the study area. Furthermore, the utilization of a more local source of sand within the study area probably would not reduce current employment at the Hahnville site.

4.1.2.2 Transportation. The use of trucks to transport sand directly from the Mississippi River to sites of use within the study area would result in between 660,000 and 1 million or more trips by large trucks along US Highway 90 and other state and local roads. This would amount to an estimately total of about 9,900,000 to 15,000,000 miles of additional highway usage by large trucks. Because river sand delivered by barges must be transported by trucks from off-loading sites to the sites of use, this method of transportation also would result in a considerable increase in the number of trips by large trucks over state and local roads. Both methods of transporting the sand would result in increased roadwear and increased consumption of fossil fuels and other petroleum products. The increased mileage would result in a greater potential for highway accidents involving large trucks. However, barging the sand would have significantly less of these negative impacts because fewer highway miles would be involved. Barging the river sand from the dredging site to the off-loading sites would have negligible impacts on waterborne transportation on the inland waterways involved.

4.1.4 Cumulative Impacts. The Mississippi River is a heavily impacted river, particularly in its lower reaches (wherein the subject alternate site is located). It is traversed by numerous vessels, including oceangoing freighters and tankers each day. It is one of the major industrial and transportation corridors in the United States. Sand dredging operations are currently ongoing in the Hahnville area, as well as other areas in the river. The continued use of sand from this area in the area of use will result in some additional impacts to the river and batture. However, when weighed in the balance and considering the dynamic nature of the Mississippi River, the cumulative impact of this alternative is insignificant.

4.1.5 Natural Resources Impacts.

4.1.5.1 Agriculture. The subject alternative would result in no impacts to agriculture.

4.1.5.2 Navigation - Because the Mississippi River is a vitally important route for waterborne transportation of thousands of different commodities, safe and efficient navigation along its course is of vital interest to the United States. The US Army Corps of Engineers and the US Coast Guard are the major Federal agencies mandated to insure that navigation is maintained as safely and freely as practicable. The alternative under consideration would not be allowed to interfere with navigation on the river.

4.1.5.3 Energy. Except for the fossil fuels and other petroleum products used in extracting and transporting the sand from the river to its ultimate destination, there would be little impact upon energy resources. It should be pointed out that the amount of energy used to transport the sand from the river to the area of use being considered in this study would exceed energy consumed to transport the product from a local source.

4.1.5.4 Fish and Wildlife Impacts. Because sand dredging operations are currently ongoing in the river at Hahnville, there would be few if any impacts to fish and wildlife populations or habitats from the continued use of this alternative to supply sand for fill in the area of use in Terrebonne and Lafourche Parishes.

4.1.6 Cultural, Historical, Social, and Archeological Impacts. There would be no impacts to these resources created by the alternative under consideration.

4.2 Nonwetland Alternatives within the Study Area.

4.2.1 Primary Impacts.

4.2.1.1 Habitat Impacts. The chenier ridges, which are the major nonwetland source of sand in the study area, because of their uniqueness, provide valuable wildlife habitat. These islands in the marsh provide growing, resting, nesting, and/or feeding habitat for a large number of animal and plant species which would not be able to exist in the area without these islands. The primary effect of obtaining sand from these chenier ridges would be to convert them into approximately 85 acres of about 50-foot deep holes surrounded by brackish to saline marsh. All existing vegetation would be destroyed and all wildlife would be displaced - if it is able to survive in the marsh, or destroyed - if it cannot survive in marsh. The loss of these ecologically unique areas would be an unmitigatible loss.

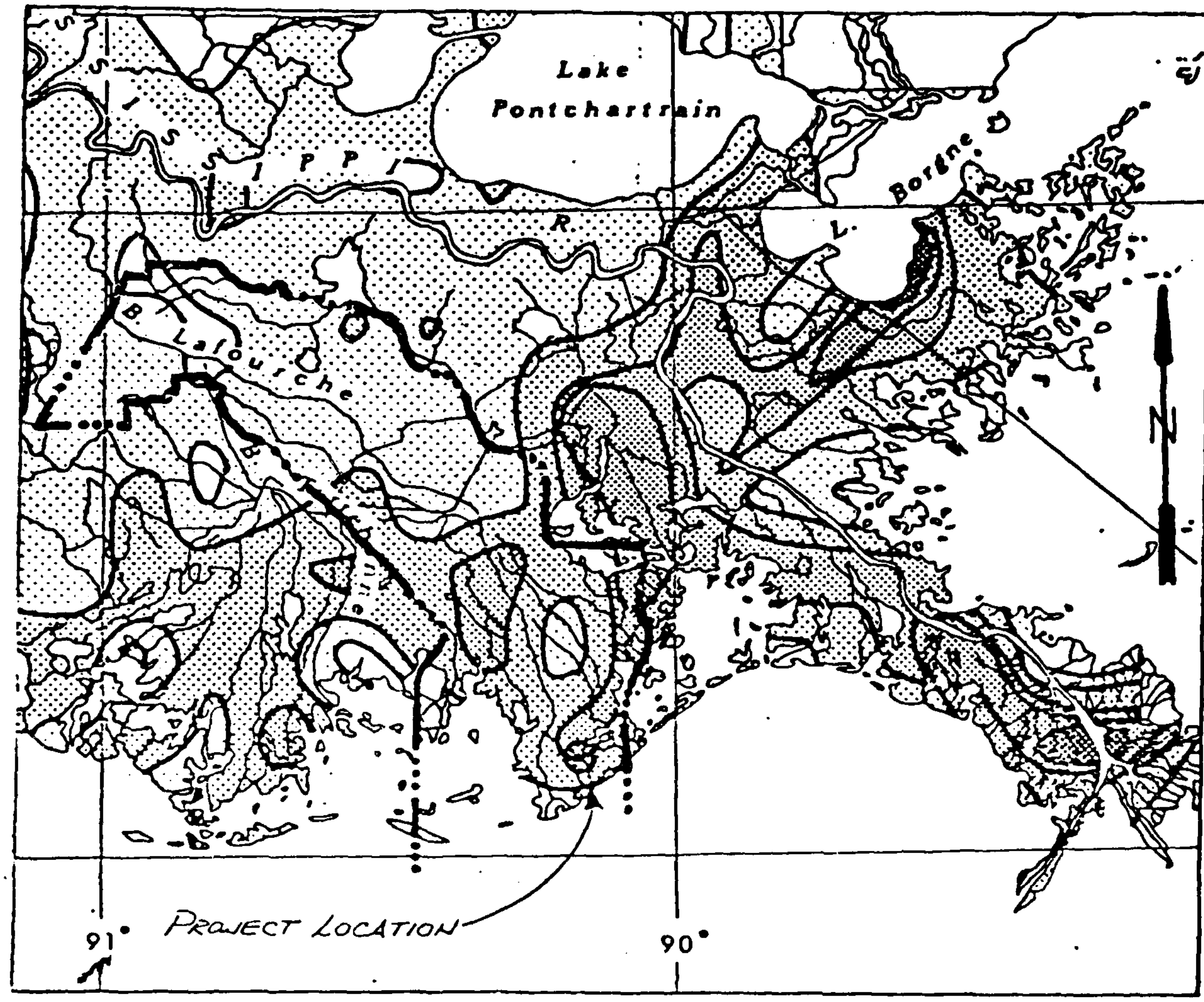
4.2.1.2 Esthetic Impacts. In addition to loss of unique habitat, mining of the chenier ridges would destroy a highly esthetic area. These islands provide, in addition to wildlife habitat, visual relief from the marsh, sites for wildlife observation and hunting, and other passive and active pursuits. These values would be destroyed by implementation of this alternative.

4.2.1.3 Water Quality Impacts. Conversion of the chenier ridges into sand pits would result in much the same water quality impacts as dredging a similar area in nearby marshes (i.e., the proposed project). These impacts will be covered in detail in Section 4.3, Wetland Sites, including the proposed locations.

4.2.1.4. Air Impacts. See Section 4.3.1.4.

4.2.2 Secondary Impacts. The secondary impacts of the subject alternative are generally similar to the secondary impacts of the proposed project. These impacts will be covered in Section 4.3.

4.2.3 Cumulative Impact. The cumulative impacts of the chenier ridge alternative are primarily involved with natural phenomenon. The coastal marsh of this portion of Louisiana is being lost to erosion and subsidence. Dredging is also a significant factor in land loss in this part of Louisiana. In the immediate vicinity of the cheniers, land loss rates are between 50 and 100 acres of land per year per 7 1/2 minute USGS quadrangle map (Gagliano and VanBeek, 1970). All, or almost all, of the land affected by this erosion is wetland (saline and/or brackish marsh). The shoreline of the Gulf of Mexico, currently about 2.8 miles (14,700 feet) southerly from the cheniers, is retreating to the north at a rate of up to 100 feet per year. The rate of shoreline erosion is more rapid in this area than in the rest of Louisiana's coastline. Relative land loss rates for coastal southeastern Louisiana are illustrated in Figure 4.2-1. The cheniers provide protection for more inland areas from storm tides, much as barrier islands provide. They provide physical barriers and absorb a large portion of the energy of storm tides which pass over them. They, thus, protect areas shoreward from them from a portion of the erosion resulting from storms. The destruction of the cheniers by removal of sand for fill could, in addition to its cumulative effect with ongoing natural and man-induced land loss, result in increased rates of land loss inland from the cheniers.



LAND LOSS IN ACRES PER YEAR

- 0—50
- 50—100
- 100—200
- 200—300
- 300—above

——— ... ——— Boundaries of Lafourche Parish

0 10 20 30 40 50 Miles

FIGURE 4.2-1
LAND LOSS RATES
SAND DREDGING OPERATIONS IN LAFOURCHE PARISH, NEAR LEEVILLE, LOUISIANA

Source:
Gagliano and Van Beek, 1970

4.2.4 Natural Resources Impacts.

4.2.4.1 Agriculture. There would be no impacts to agriculture due to implementation of the subject alternative.

4.2.4.2 Navigation. There would be no direct or induced impacts to navigation resulting from implementation of this alternative.

4.2.4.3 Energy. The chenier ridge alternative would not impact energy exploration, production, or distribution. The only impact to energy supplies anticipated to result from the subject alternative is the use of fossil fuels and other petroleum products in the dredging operation and transportation of the resource to its destination.

4.2.4.4 Fish and Wildlife. There is little or no commercial hunting, trapping, or fishing on the subject cheniers. Most of these activities are recreational. The loss of this habitat would have its most serious consequences for wildlife, as the cheniers represent the major upland habitat in a vast area of marshland. Eighty-five acres of open water habitat would be created which could be utilized by fish. However, the quality of this open water habitat would be severely limited. Because of the steep sides of the pits and the extreme depths of same, there would be no spawning or nursery habitat, and the deep portions of the pits, which would likely not be utilized by fish would become a sump or trap for most nutrients flowing into the pits from the surrounding marsh. Also, due to the anaerobic conditions which would be expected to prevail in the bottoms of the pits, no habitat for benthic organisms would be created.

4.2.4.5 Cultural, Historical, Social, and Archeological. There are no known archeological or historical sites which would be impacted by the chenier ridge alternative.

4.3 Wetland Sites, Including the Proposed Locations.

4.3.1 Primary Impacts.

4.3.1.1 Habitat Impacts. Implementation of the proposed project, or any alternative wetland location in the project area would result in the conversion of 180 acres of brackish marsh and areas of shallow open water to open water pits averaging about 45 feet in depth. All existing plant communities would be permanently destroyed and virtually all wildlife habitat value lost. Benthic communities would be permanently destroyed. Fishery habitat, while not completely destroyed, would be severely degraded.

4.3.1.2 Esthetic Impacts. During the active lifetime of the pits, the retaining dikes and levees, stockpiled sand, and heavy equipment operating in the marsh would create a negative esthetic impact. Upon completion of the project, if the levees are removed, the only visual change would be the replacement of marsh vegetation with open water. This esthetic impact would be fairly minor. The nearness of the proposed pits to Louisiana Highway 1 would increase the severity of any negative esthetic impacts due to high visibility.

4.3.1.3 Water Quality Impacts. In May 1978, two flooded, abandoned sand pits in the vicinity of the proposed project were sampled for salinity, temperature, and dissolved oxygen. One pit, located east of the proposed site, was found to be 28 feet deep. This pit was abandoned and flooded in September 1977. The other pit sampled, about 1 mile west of the proposed site, is about 8 feet deep. This pit has been flooded for several years. Profiles of the parameters measured in both pits are presented in Figure 4.3-2. The deeper pit had essentially no dissolved oxygen after 3.5 meters, while this occurred after only 2.0 meters in the shallower pit. The deeper pit had a lower surface salinity (15 ppt) than the shallower pit (21 ppt), but increased with depth (19 ppt at bottom), while it remained relatively constant in the other pit. Temperature followed the same pattern in both pits, but there was a 15 degree difference between surface and bottom in the deeper pit. It is probable that the dissolved oxygen profiles in these pits would generally follow the same pattern year round. Studies in pipeline canals in marsh areas by Ronald H. Kilgen of Nicholls State University (unpublished data) revealed that water in these canals, up to 4 meters (13 feet) in depth, generally had less than 2 mg/l oxygen after 2 meters. It is reasonable to assume that the water quality of the pits resulting from the proposed project would be similar to that found above. In addition, construction of levees at the proposed project would cause temporarily increased turbidities in the watered areas adjacent to the project site. Nutrients, heavy metals, and materials with a high BOD would be temporarily released into the surrounding ecosystem. The levels of turbidity and heavy metals in water adjacent to the proposed project would significantly increase due to placement of dredged material during levee construction, and also due to runoff and leaching from the levee after construction. EPA guidelines for mercury, lead, and cadmium would be exceeded. Although there is evidence from other studies that elutriate levels of these metals in many pristine marsh soils are high in Louisiana, no evidence has been found that the values encountered here are typical, or that significant food-chain enrichment would not occur as these metals become elements of the trophic system. The effects would be minimized, however, since water would be pumped from one phase of the project to another, rather than being pumped directly into the surrounding marsh. Water escaping into the marsh will have seeped through the levee, thus filtering out many pollutants. The great depth of the pit, compared to the surrounding area, would cause the entrapment of sediments and nutrients in the bottom of the pit. Bottom waters would probably be anaerobic. Natural drainage patterns in the immediate area of the proposed project site are nearly nonexistent, consisting of overload flow in the form of sheet flow of rain and tidal waters. This natural sheet flow is impacted by

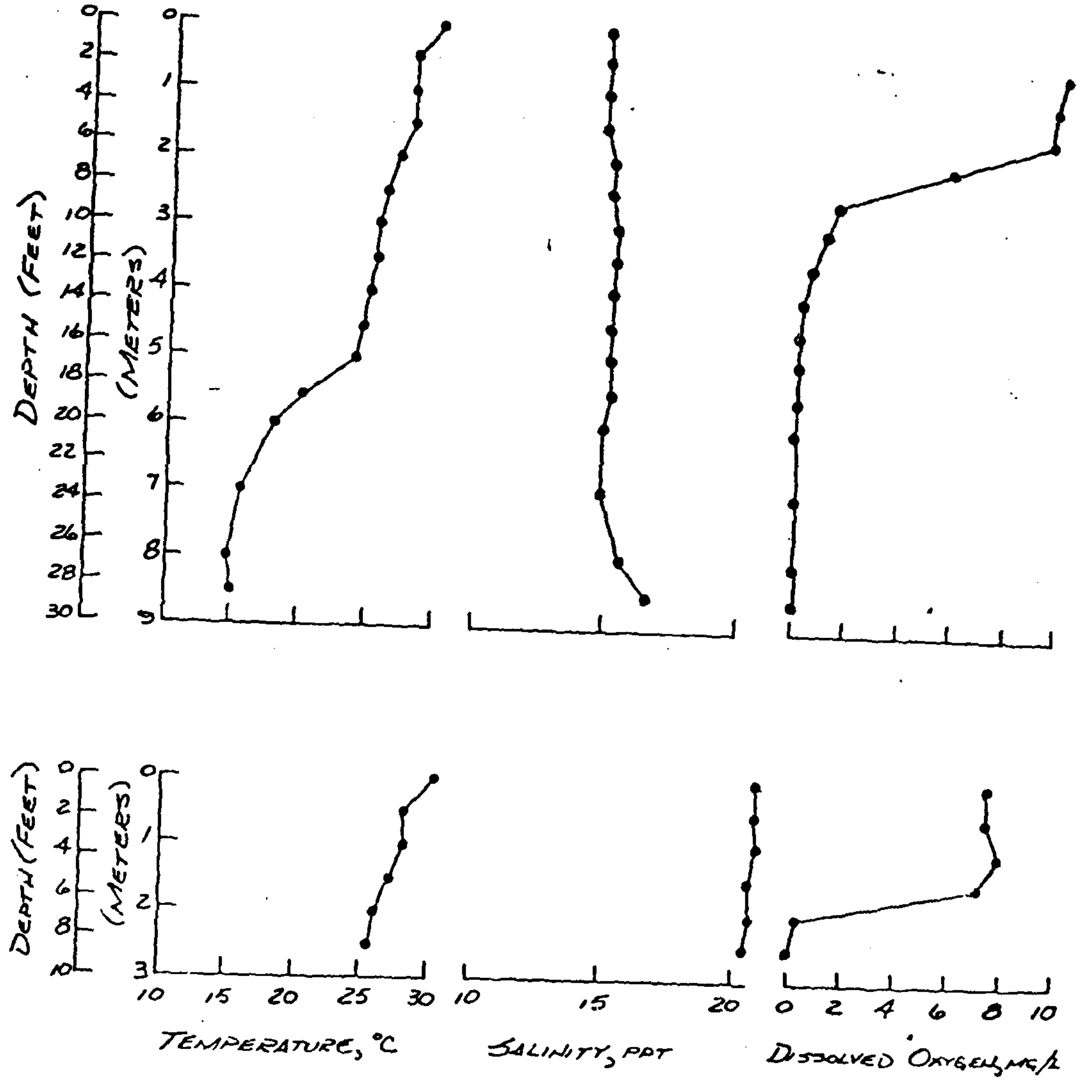


FIGURE 4.3-2

WATER COLUMN PROFILES IN TWO FLOODED PITS - 20 MAY 1978

SAND DREDGING OPERATIONS IN LAFOURCHE PARISH, NEAR LEEVILLE, LOUISIANA

the chenier ridge and Louisiana Highway 1. Because all of the proposed pits will be located immediately adjacent to these existing barriers, they should have no additional significant impact on the natural drainage patterns in the project area. Furthermore, any such impact would be short-term if the levees surrounding the pits are completely removed or partially removed at the completion of the dredging operations.

4.3.1.4 Air Impacts. During construction of levees and mining operations, noise and air pollution would exist at the proposed site. The principal impacts would be noise from heavy machinery (draglines, trucks) and smoke from the exhaust systems of this equipment. These problems would affect only the inhabitants of the camp-type dwellings located just west of the proposed site. When the project is completed, there would no longer be any air impacts.

4.3.2 Secondary Impacts.

4.3.2.1 Socioeconomic Impacts. The implementation of a local, large scale sand dredging operation could have an impact on nearby operations. However, due to their small size, the existing operations cannot supply the amount of sand needed in the project area (see Table 1.2-1). The proposed project could create a few jobs in the area. However, most of the work would probably be done by existing contractors. A local source of fill sand in the project area would provide a significant monetary savings over Mississippi River sand. This saving could amount to 93 to 257 percent (see detailed discussion at 4.1.2).

4.3.2.2 Transportation. (See discussion at 4.1.2.2).

4.3.2.3 Habitat. Upon completion of the proposed project, the pits would be abandoned and allowed to fill with water. These pits would eventually be stocked through natural means by fish. Only the surface waters of the abandoned pits would provide any fish habitat due to the extreme depths. No new spawning or nursery areas would be created by the proposed project.

4.3.2.4 Public Safety. Although no serious accidents are known to have occurred in existing pits in this area, drownings are known to have occurred in deep borrow pits in other parts of the country and the possibility exists that accidental drownings could occur in the proposed pits, as well as in existing pits, due to their not being marked with signs indicating their depth. To prevent such accidents, the pits will be posted with warning signs indicating the extreme depths.

4.3.2.5 Public Health. During the period in which the levee is in place, additional breeding places would be created for mosquitoes and other disease vectors.

4.3.3 Cumulative Impacts. The discussion of ongoing land loss (especially wetlands) in the project area at 4.2.3 is applicable at this point. Using an average annual land loss of about 75 acres per 7 1/2 minute USGS quadrangle, the proposed project would result in an average annual increase of 9 acres over 20 years. This would be a 12 percent increase over the normal land loss rate. It is highly likely that 85 acres of nonwetland will be lost even without the proposed projects, due to the fact that the owners of the cheniers in the area would probably utilize the cheniers as a source for sand if the marsh alternative is not available, to them. However, dredging of the cheniers, while not regulated by the US Army Corps of Engineers, would require a Coastal Use permit from the Louisiana Department of Natural Resources.

4.3.4 Natural Resources Impacts.

4.3.4.1 Agriculture. The proposed alternative would not impact agricultural resources.

4.3.4.2 Navigation. The proposed alternative would not impact navigation.

4.3.4.3 Energy. The proposed alternative would result in a net savings in fossil fuels and other petroleum products consumption over the presently utilized Mississippi River alternative.

4.3.4.4 Aquatic Resources. The conversion of 180 acres of marsh and shallow open water to a deep, water-filled pit would virtually eliminate nearly all benthic organisms, due to anaerobic conditions to be expected at the bottom of the pit. Turner (1977) has shown a direct relationship between the abundance and type of commercially valuable quantities of brown shrimp and the absolute area and type of estuarine-intertidal vegetation. Lindall et al. (c. 1972) attempted to determine the productivity of the various hydrologic units along the Louisiana coastline in terms of pounds of commercial fisheries landings generated by each unit, and also in terms of pounds per acre theoretically produced by each hydrologic unit. They estimated that Hydrologic Unit IV, in which the proposed project would be located, supplied over 44 percent of the annual commercial fisheries production in Louisiana during 1963-1967. Five organisms account for over 96 percent of the commercial landings of non-sessile, estuarine-dependent organisms in Louisiana. According to Lindall et al. (c. 1972), Hydrologic Unit IV provides the following proportions of the total state landings for these organisms: menhaden (47 percent); shrimp (27 percent); blue crabs (30 percent); spotted seatrout (26 percent); and red drum (23 percent). Chabreck (1972) stated that Hydrologic Unit IV consists of 1,289,796 acres, of which 370,595 acres are non-marsh (dry land, swamp, and de-watered marsh), and 919,210 acres are marsh (saline, brackish, intermediate, and fresh) and water bodies. Assuming that the marshes and water bodies provide the estuarine environment necessary for the production of commercially important fisheries, an estimate of the productivity of the marshes in Hydrologic Unit IV and of potential losses can be made (Table 4.3-1). The total dollar per acre per year value of the marsh for commercial fisheries in this hydrologic unit is slightly more than twice that ascribed to Louisiana coastal marshes by Gosselink, Odum and Pope (1974).

TABLE 4.3-1

ESTIMATED PRESENT PRODUCTIVITY AND POTENTIAL LOSSES TO COMMERCIAL AND SPORT FISHERIES IN HYDROLOGIC UNIT IV RESULTING FROM PROPOSED PROJECTS

			Annual Potential Losses for 180 Acres		Potential Losses (150 Years)	
Organism	lb./acre(a)	$/acre(a)	lb.	$	lb.(b)	$(b)
Menhaden	999.82	50.27	179,967.6	9,048.60	26,995.14	1,357.29
Shrimp	54.04	44.17	9,727.2	7,950.60	1,459.08	1,192.59
Croaker	13.06	.55	2,350.8	99.00	352.62	14.85
Blue Crab	7.30	1.07	1,314.0	192.60	197.10	28.89
Oysters	9.46	6.22	1,702.8	1,119.60	255.42	167.94
Sea Trout	3.39	.38	610.2	68.40	91.53	10.26
Spot	2.13	.09	383.4	16.20	57.51	2.43
Red Drum	0.48	.11	86.4	19.80	12.96	2.97
TOTAL	1,089.68	$102.86	196,142.4	$18,514.80	29,421.36	$2,777.22

(a) These values are ex-vessel and were derived from Value of Wetlands and Bottomland Hardwoods, New Orleans District, US Army Corps of Engineers, July 1977, Unpublished.
(b) In thousands.

4.3.4.5 Cultural, Historical, Social, and Archeological. There are no known historical or archeological sites which could be impacted by the proposed projects.

4.4 Alternative Levee Dispositions.

4.4.1 Complete Removal of All Levees. This alternative would result in open water with no visible remains of the dredging operation. Esthetically it would be more natural appearing than leaving the levee in place. This alternative would allow free access to the pit area by fish and planktonic organisms and would allow the reestablishment of marsh vegetation along the former levee alinements. It would also allow any detritus moving with any water movement to enter the pit and settle to the bottom of the pit. No refuge for semi-aquatic or terrestrial organisms would be provided by this alternative.

4.4.2 Partial Removal of Levees. By breeching the levee at specific points (i.e., 50-foot gaps every 500 feet), some of the negative impacts of levee removal could be lessened. Aquatic organisms would have access to the pits, via the gaps, and could gain whatever value the pits would offer to them. The amount of detritus and nutrients flowing into the pits would probably be lessened, thus reducing the pits ability to act as nutrient sumps. The remaining portions of the levees would most likely become vegetated by shrubby and herbaceous vegetation, and perhaps some trees. This would provide resting habitat for semi-aquatic animals, and nesting, resting, and/or feeding habitat for avifauna and other terrestrial animals.

4.4.3 Leave Levees Intact. Leaving the levees intact would serve to prevent the abandoned pits from becoming a nutrient sump. It would also prevent the regular utilization of the area by aquatic organisms. The abandoned pits would undoubtedly be colonized by aquatic organisms by storm and other unusually high tides, but there would be no free ingress or egress. The levees would become colonized by semi-aquatic and terrestrial organisms as noted in the previous paragraph.

4.5 Alternative Dredging Depths. It would be impractical for the subject area to be dredged any deeper than approximately 45 feet deep. To dredge a shallower pit would require a greater area to be dredged than proposed. To prevent the pits from acting as entraining areas for nutrients which would flow into them, it would be necessary to restrict dredging depths to no more than about 6 feet. This is the depth at which waters in this area generally become anaerobic and, therefore, unsuitable to sustaining most aquatic life which would utilize the nutrients otherwise entrained in the pits. This type of a depth restriction would require the dredging of about 1,386 acres to obtain the needed amount of sand. Generally speaking, the impacts of dredging any depth below 6 feet would be similar (i.e., anaerobic water and sediment conditions, nutrient entrainment, etc.), therefore, it would be most beneficial, environmentally, to dredge as small an area as practicable to obtain the needed amount of sand.

5. LIST OF PREPARERS

The following people were primarily responsible for preparing this Environmental Impact Statement:

NAME	DISCIPLINE	EXPERIENCE	ROLE IN PREPARING EIS
Mr. Michael Skougard	Botanist	3 years EIS studies, Corps of Engineers, New Orleans District M. S. Botany	EIS Coordinator
Dr. Ronald Kilgen	Fisheries Biologist	7 years EIS studies, Private environmental consultant Ph.D. Fisheries Biology	Provided all data for Picciola interests
Mr. Ronnie W. Duke	Wildlife Biologist	5 years EIS studies, T. Baker Smith & Son, Biology	Provided biological and socioeconomic data for Plaisance interests
Mr. Horace J. Thibodaux	Environmental Sanitarian	3 years EIS studies, T. Baker Smith & Son, Inc.; 5 years EIS studies Louisiana Department of Health and Human Resources B. S. Agriculture	Provided water quality and public health data for Plaisance interests
Dr. Linda L. Glenboski	Botanist	1 year EIS studies, Corps of Engineers, New Orleans District Ph.D. Biology	Coordinated comments relative to preparation of final EIS

6. Public Involvement.

6.1 Public Involvement Program.

6.1.1 Scoping Process. The comments received on the earlier DEIS were deemed to constitute sufficient input from Federal, state, and local governmental bodies, concerned groups, and proviate citizens to comply with the requirement for a scoping process (40 CFR 1501.7). Coordination was maintained throughout the study with other agencies, including US Environmental Protection Agency, US Fish and Wildlife Service, National Marine Fisheries Service, Louisiana Department of Wildlife and Fisheries, and with other concerned groups or individuals.

6.1.2 Public Hearings. No public hearing was held to discuss the proposed projects.

6.2 Statement Recipients. All Federal and state agencies, local governing authorities, environmental groups, individuals, and other interested groups listed below have received copies of the draft EIS. Distribution of the final EIS, to those on this list, will be the same as that of the draft EIS.

Federal

J. Bennett Johnston, US Senator
Russell B. Long, US Senator
Corinne C. Boggs, US Congresswoman
John B. Breaux, US Congressman
Jerry Huckaby, US Congressman
Robert L. Livingston, US Congressman
Gillis W. Long, US Congressman
W. Henson Moore, US Congressman
Charles Roemer III, US Congressman
US Department of Interior, Office of the Secretary, Washington, D.C.
US Department of Interior, Assistant Secretary for Program Development and Budget, Office of Environmental Project Review, Washington, DC
US Department of the Interior, Regional Director, Bureau of Outdoor Recreation, SC Region, Albuquerque, New Mexico
Advisory Council on Historic Preservation, Lakewood, Colorado
US Fish and Wildlife Service, Regional Director, Atlanta, Georgia
US Fish and Wildlife Service, Area Manager, Jackson, Mississippi
US Fish and Wildlife Service, Field Supervisor, Vicksburg, Mississippi

US Fish and Wildlife Service, Field Supervisor,
Lafayette, Louisiana
Environmental Protection Agency, Administrator,
Washington, DC
Environmental Protection Agency, Regional Administrator,
Region VI, Dallas, Texas
Environmental Protection Agency, Permits and Enforcement Branch
Dallas, Texas
US Department of Commerce, Dupty Assistant Secretary for
Environmental Affairs, Washington, DC
US Department of Commerce, Regional Director,
National Marine Fisheries Service,
St. Petersburg, Florida
US Department of Commerce, Area Supervisor,
National Marine Fisheries Service, Water
Resource Division, Galveston, Texas
US Department of Agriculture, Regional Forester, Forest Service,
Atlanta, Georgia
US Department of Agriculture, State Conservationist,
Soil Conversation Service, Alexandria, Louisiana
US Department of Transportation, Division Engineer,
Federal Highway Administration, Baton Rouge, Louisiana
US Department of Commerce, National Oceanic and
Atmospheric Administration, Office of Ecology and
Conservation, Rockville, Maryland
US Department of Transportation, Commander,
Second Coast Guard District, St. Louis, Missouri
US Department of Health, Education and Welfare
Regional Director, Public Health Service,
Region VI, Dallas Texas
US Department of Health, Education and Welfare,
Water Resources Activity, Vector Biology and Control
Division, Atlanta, Georgia
US Department of Housing and Urban Development,
Regional Administrator, Region VI, Dallas, Texas
US Department of Energy, Director, Federal Energy
Administration, Environmental Impact Division,
Office of Environmental Programs, Washington, DC
US Department of Energy, Advisor on Environmental
Quality, Federal Power Commission, Washington, DC
US Army Engineer Division, Lower Mississippi Valley,
Attention: LMVCO-N, Vicksburg, Mississippi
US Army Engineers, Shreveport Area Office, Area Engineer,
Shreveport, Louisiana
Heritage Conservation and Recreation Service,
South Central Region, Albuquerque, New Mexico
Interagency Archeological Services - Atlanta -
Heritage Conservation and Recreation Service,
Atlanta, Georgia

State

State Senators, Districts 19 and 20
State Representatives, Districts 53, 54, and 55
Office of Governor, Baton Rouge, Louisiana
Office of the Lieutenant Governor, Baton Rouge, Louisiana
Office of the Attorney General, Baton Rouge, Louisiana
Office of Intergovernmental Relations, Office of the Governor, Baton Rouge, Louisiana
Louisiana Department of Health and Human Resources, Office of Health Service and Environmental Quality, New Orleans, Louisiana
Louisiana Department of Transportation and Development, Office of Public Works, Baton Rouge, Louisiana
Louisiana Department of Transportation and Development Office of Public Works, Alexandria, Louisiana
Louisiana Department of Transportation and Development, Office of Highways, Impact Engineer, Baton Rouge, Louisiana
Louisiana Department of Transportation and Development, Office of Management and Finance, Project Control Engineer, Baton Rouge, Louisiana
Lousiana Department of Agriculture, Commissioner, Baton Rouge, Louisiana
Louisiana Department of Commerce, Secretary, Baton Rouge, Louisiana
Louisiana Department of Wildlife and Fisheries, Secretary, New Orleans, Louisiana
Louisiana Department of Wildlife and Fisheries, Refuge Division, Chief, New Orleans, Louisiana
Louisiana Department of Wildlife and Fisheries, Game Division, Chief, Baton Rouge, Louisiana
Louisiana Department of Wildlife and Fisheries, Fish Division, Baton Rouge, Louisiana
Lousiana Department of Wildlife and Fisheries, Coordinator, Environmental Section, Baton Rouge, Louisiana
Louisiana State and Recreation Commission, Baton Rouge, Louisiana
Louisiana Archeological Survey and Antiquities Commission, State Archeologist, Baton Rouge, Louisiana
Louisiana Air Control Commission, New Orleans, Louisiana
Louisiana Public Service Commission, Baton Rouge, Louisiana
Louisiana Department of Natural Resources, Office of Forestry, Baton Rouge, Louisiana
Louisiana Department of Natural Resources, Office of Conservation, Baton Rouge, Loiusiana
Louisiana Department of Natural Resources, Office of State Lands, Baton Rouge, Louisiana
Louisiana Department of Natural Resources, Office of Environmental Affairs, Water Pollution Control Division, Baton Rouge, Louisiana
Lousiana Department of Culture, Recreation, and Tourism, Division of Archaeology and Historic Preservation, State Historic Preservation Officer, Baton Rouge, Louisiana

Lousiana Department of Justice, Environmental Section, New Orleans, Louisiana
Louisiana Joint Legislative Committee on Environmental Quality, Louisiana Legislature, Baton Rouge, Louisiana
Louisiana State Planning Officer, Baton Rouge, Louisiana
Louisiana State Soil and Water Conservation Committee, Louisiana State University, Baton Rouge, Louisiana
Louisiana State University, Associate Director, Sea Grant Program, Center for Wetland Resources, Baton Rouge, Louisiana
Louisiana State University, Curator of Anthropology, Department of Geography and Anthropology, Baton Rouge, Louisiana
University of New Orleans, Coordinator, Environmental Impact Section, Department of Environmental Affairs, New Orleans, Louisiana

Local

Office of Intergovernmental Relantions
President, Lafourche Parish Police Jury
Mayor, Town of Golden Meadow
South-Central Planning and Development Commission
Secretary of the Teche District Clearinghouse
President, Greater Lafourche Port Commission
President, South Louisiana Tidewater Levee District

Environmental

Ecology Center of Louisiana, Inc., New Orleans, Louisiana
Orleans Audubon Society, New Orleans, Louisiana
National Audubon Society, Library, New York, New York
National Audubon Society, Southwestern Regional Office, Regional Representative, Austin, Texas
Delta Chapter, Sierra Club, New Orleans, Louisiana
Delta Chapter, Sierra Club, Baton Rouge, Louisiana
National Sierra Club, San Francisco, California
National Wildlife Federation, Washington DC
Louisiana Wildlife Federation, Baton Rouge, Louisiana
Louisiana Wildlife Federation, Water Control Project Committee Chairman, New Iberia, Louisiana
Wildlife Management Institute, Washington, DC
Wildlife Management Institute, Southcentral Representative, Dripping Springs, Texas
The Conversation Foundation, Washington, DC
Environmental Defense Fund, New York, New York
Trout Unlimited, San Antonio, Texas
Natural Resources Defense Council, Washington, DC
Environmental Information Center, Inc., New York, New York
League of Women Voters of the US, Baton Rouge, Louisiana
The Fund of Animals, Inc., Field Agent, Jefferson, Louisiana
Louisiana Environmental Professionals Association, Metairie, Louisiana

Requesting Individuals

Freddy Trosclair, Jr.

Others

Gulf States Marine Fisheries Commission
Louisiana Shipbuilders and Repair Association
American Institute of Merchant Shippping
Gulf of Mexico Fishery Management Council
Continental Shelf Associates, Inc.
Louisiana Power and Light
Pyburn & Odum, Inc.
T. Baker Smith & Son, Inc.
Energy Impact Associates
Morris Hebert, Inc.
Environmental Professionals, Limited

6.3 Statement Commentators. Pertinent correspondence and responses to comments in the correspondence is presented in this section.

TABLE OF CONTENTS

1

Advisory Council On Historic Preservation

This response does not constitute Council comment pursuant to Section 106 of the National Historic Preservation Act or Section 2(b) of Executive Order 11593.

1522 K Street, NW
Washington DC 20005

Reply to

Lake Plaza South Suite 616
44 Union Boulevard
Lakewood, CO 80228

June 3, 1981

Colonel Thomas A. Sands
District Engineer
Department of the Army
New Orleans District, Corps of Engineers
P.O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Sands:

This is in response to your request for comments on the draft environmental statement (DES) for the "Sand Dredging Operations in Lafourche Parish, Near Leeville, Louisiana."

The Council has reviewed the DES and notes that the Corps has determined that the proposed undertaking will not affect properties included in or eligible for inclusion in the National Register of Historic Places. Accordingly, the Council has no further comment to make at this time. 1.1 It is suggested, however, that the final environmental statement contain the Louisiana State Historic Preservation Officer's concurrence in the Corps' determination of no effect.

Should you have questions or require additional information, please call Jane King at (303) 234-4946.

Sincerely,

Louis S. Wall
Chief, Western Division
of Project Review

RESPONSE 1.1: See comment by the Louisiana State Historic Preservation Officer and response at page .

United States Department of Agriculture

Soil Conservation Service

3737 Government Street
Alexandria, LA 71301

June 8, 1981

Colonel Thomas A. Sands
District Engineer
Corps of Engineers
P. O. Box 60267
New Orleans, LA 70160

Dear Colonel Sands:

Attn: LMNOD-SA

The following comments are offered on the Draft Environmental Impact Statement for "Sand Dredging Operations in Lafourche Parish, near Leesville, LA."

2.1 The alternative of using sand from the Mississippi River should receive additional consideration. This alternative may increase transportation cost and be less convenient, but would prevent the loss of 180 acres of wetlands. The combined forces of subsidence, salt water intrusion, and construction activities are having a serious cumulative effect on the marsh and estuarine acreage in Louisiana.

2.2 The possible mitigation plan to dedicate marsh land to the Wisner Wildlife Management Area should be based on habitat value, rather than acre-for-acre basis.

We appreciate the opportunity to make comments on the draft EIS.

Sincerely,

Harry A. Fischer

Alton Mangum Acting
State Conservationist

cc: Norman Berg, Chief, SCS, Washington
Edward E. Thomas, Assistant Chief, SE, SCS, Washington, D.C.
Billy M. Johnson, Director, STSC, SCS, Fort Worth
Director, Environmental Services, SCS, Washington, D.C.

RESPONSE 2.1: See comment by Coastal Management Section of the Louisiana Department of Natural Resources and response in Section 2. <u>Alternatives</u>, and Section 4. <u>Environmental Consequences</u>.

RESPONSE 2.2: The applicants have indicated a willingness to donate land on an acre-for-acre basis to the Wisner Wildlife Management Area. Any decision to change the applicants' suggested mitigation plan from one involving the dedication of land on an acre-for-acre basis to one involving the dedication of land based on habitat value must reflect agreement between the applicants and appropriate state and Federal agencies. See Section 2.9 <u>Permit Conditions and Mitigation and/or Compensation Plans</u> for US Army Corps of Engineers policy on conditioning permits and mitigative measures.

OD-5 3

GENERAL COUNSEL OF THE
UNITED STATES DEPARTMENT OF COMMERCE
Washington D.C. 20230

29 JUL 1981

Colonel Thomas A. Sands
District Engineer
New Orleans District, Corps of Engineers
Department of the Army
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Sands:

This is in reference to your draft environmental impact statement entitled, "Sand Dredging Operations in Lafourche Parish, Near Leeville, Louisiana." The enclose[illegible] [illegible]ment from the National Oceanic and Atmospheric Admin[illegible]ion is forwarded for your consideration.

Thank you for giving us an opportunity to provide this comment which we hope will be of assistance to you. We would appreciate receiving four copies of the final environmental impact statement.

Sincerely,

Robert T. Miki
Director of Regulatory Policy

Enclosure Memo from: D. R. Ekberg
National Marine Fisheries Service
National Oceanic and Atmospheric Administration

4

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Region
9450 Koger Boulevard
St. Petersburg, FL 33702

July 7, 1981 F/SER61/DM
893-3503

TO: PP/EC - Joyce Wood

FROM: F/SER61 - D. R. Ekberg

SUBJECT: Comments on Draft Environmental Impact Statement - Sand Dredging Operations in Lafourche Parish, near Leeville, Louisiana DEIS #8106.01

The draft environmental impact statement for Sand Dredging Operations in Lafourche Parish, near Leeville, Louisiana, that accompanied your memorandum of June 29, 1981, has been received by the National Marine Fisheries Service for review and comment.

The statement has been reviewed and the following comments are offered for your consideration. We previously reviewed an earlier DEIS on one of these projects in a memo of January 10, 1979.

General Comments

The DEIS, while adequate in some respects, fails to portray the full values of the marine fishery resources that would be adversely impacted by the proposed project. The DEIS does not address the cumulative impacts of the project to marine fishery resources as fully as was requested in our January 1979 comments on an earlier DEIS for the Picciola proposal. Only two of the seven references we included in that memo have been used in this DEIS. Also, alternative sand sources from nearby navigation projects such as the Port Fourchon Entrance Channel, at the mouth of Bayou Lafourche, and the proposed deepening of the Gulf Intracoastal Waterway should be discussed in addition to those alternative sources presented. Transportation of sand from alternative sources by barge as well as truck should be discussed.

In considering land loss and drainage, the FEIS should note that the erosion resulting from the projects can cause further erosion as flow connections occur with other projects. Therefore, the projects cannot be considered only by themselves in estimating the losses of marine fishery resources.

Specific Comments

2. Alternative sources

4.1 Other alternative sources for fill material that should be discussed are from navigation projects in Lafourche Parish such as deepening of the GIWW or the Port Fourchon entrance channel in the mouth of Bayou Lafourche.

2.6.1 Picciola Proposal.

4.2 Page 2.2, paragraph 2. This section should discuss the alternative of constructing the proposed perimeter levees with borrow material taken from within a proposed excavation site. This construction technique would further reduce project impacts which would still be considerable.

2.6.2 Plaisance Proposal.

2.6.2.1 Bucket Dredge.

4.2 Page 2.2, paragraph 7. Same as preceding comment.

3.1 Mississippi River.

3.1.2 Environmental Setting.

3.1.2.3 Water quality.

4.3 Page 3-6, Table 3.1-2. Concentration values for sulfate and silica appear to be in error. Therefore, this table should be checked and corrected, if necessary.

3. Affected Environment.

3.4 Wetland Sites, Including the Proposed Locations.

3.4.1 Significant Resources.

3.4.1.2 Fisheries.

4.4 Page 3-20, paragraph 4. This section should note that the value of fishery landings is ex-vessel or dockside and that the total value is several times greater. For example, Penn (1973) noted that harvesting accounted for only $0.46 and $0.24 of the consumer's

RESPONSE 4.1: The navigation projects were considered but not included as alternative sources of fill sand for the following reasons. Much of the demand for fill sand in the project area is for road construction. Dredge material from the G.I.W.W. contains silts and clays and does not meet the specifications required for road fill by the Louisiana Department of Transportation and Development. Furthermore, if the G.I.W.W. is used as a source of fill sand, large areas on either side of the waterway would be utilized as setting basins or containment areas for accumulations of material and much of the area on either side of the waterway is wetlands. The sand obtained from the deepening of the Port Fourchon entrance channel is utilized as fill at the port site.

RESPONSE 4.2: Both applicants have agreed to construct the proposed perimeter levees with borrow material from within a proposed excavation site rather than from a separate ditch. If Department of the Army permits are issued, they would be conditioned to reflect this modification.

RESPONSE 4.3: Table 3.1-2 Mississippi River Chemical and Physical Characteristics at Luling, Louisiana-1975 through 1977 has been checked and corrected.

AD-A126 632 SAND DREDGING OPERATIONS IN LAFOURCHE PARISH NEAR LEEVILLE LOUISIANA(U) ARMY ENGINEER DISTRICT NEW ORLEANS LA APR 82

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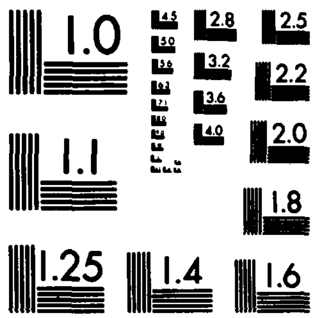

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

dollar spent for frozen peeled shrimp and fresh blue crab meat, respectively. Also, Jones et al. (1974) showed that one dollar of output by the Texas shrimp industry has a total economic output impact on the State's economy of $3.08.

RESPONSE 4.4: Section 3.4.1.2 Fisheries has been revised as suggested.

4.4 This section should note that over 22 million fish were landed in 1979 in Louisiana by recreational fishermen (National Marine Fisheries Service, 1980). Most of these fish are estuarine-dependent.

3.4.2 Environmental Setting.

3.4.2.2 Fauna.

4.5 Page 3-22, paragraph 6. The last line should be revised to indicate that several freshwater fish which may occur in estuarine waters are listed in Appendix C.

RESPONSE 4.5: Section 3.4.2.2 Fauna has been revised as suggested.

3.4.3 Socioeconomic.

3.4.3.3 Economic elements.

4.6 Page 3-32, paragraph 1. The fishery value statistics used here are older than those cited in section 3.4.2.2 since they are from a 1976 NMFS source not included in the Reference section. Also, as noted in our comments on Section 3.4.1.2, it should be emphasized that the indicated values are only ex-vessel (dockside) and that the total economic value is several times greater. Also, the value of the recreational fisheries should be indicated.

RESPONSE 4.6: Section 3.4.3.3 Economic Elements, paragraph 6, has been re as suggested.

4. Environmental Consequences.

4.1 Mississippi River Alternative.

4.1.2 Secondary Impacts

4.1.2.2 Transportation.

4.7 Page 4-3, paragraph 2. This section should fully discuss the possible use of barges to transport sand from the Mississippi River in comparison to the use of trucks. Barge use should greatly reduce the adverse impacts discussed in the DEIS to at or below the level of impacts from transportation associated with sand mining from wetlands.

RESPONSE 4.7: Section 4.1.2.2 Transportation has been expanded as sugge

4.13 types combined in Hydrologic Unit IV, not just the brackish to saline marsh types, these estimates may be too low. Therefore, necessary supporting rationale and methodology should be provided in the text. In addition, the potential annual monetary loss should be presented in terms of total economic output impact.

RESPONSE 4.13: As stated in Section 4.3.4.4 Aquatic Resources, given in Table 4.3-1 are an estimate of the productivity of the Hydrologic Unit IV; other habitat types, both wetland and nonwet included in these estimates.

4.4 Alternative Levee Dispositions.

4.4.1 Complete Removal of All Levees.

4.14 Page 4-12, paragraph 2. This paragraph should discuss the possibility of recreating some marsh along the pit margins with levee material and reestablishing marsh along the levee alignments, even though there would still be a great net loss of marsh from the sand dredging in wetlands.

RESPONSE 4.14: Section 4.4.1 Complete Removal of All Levees has as suggested.

CLEARANCE: SIGNATURE AND DATE

F/HP:R.Smith

Enclosure
Literature Cited

cc:
F/HP(3)
GOMFMC
F/SER612

5

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FORT WORTH REGIONAL OFFICE
221 WEST LANCASTER AVENUE
P.O. BOX 2905
FORT WORTH, TEXAS 76113

REGION VI

IN REPLY REFER TO:

July 14, 1981

Colonel Thomas A. Sands
District Engineer
New Orleans District
Corps of Engineers, U.S. Army
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Sands:

The Draft Environmental Impact Statement (DEIS), "Sand Dredging Operations in Lafourche Parish, near Leeville, Louisiana," has been reviewed in the Department of Housing and Urban Development's New Orleans Area Office and Fort Worth Regional Office, and it has been determined that the Department will not comment on the subject DEIS.

Sincerely,

Victor J. Hancock
Environmental Clearance Officer

RESPONSE 5: Noted.

AREA OFFICES
DALLAS, TEXAS · LITTLE ROCK, ARKANSAS · NEW ORLEANS, LOUISIANA · OKLAHOMA CITY, OKLAHOMA · SAN ANTONIO, TEXAS

6

United States Department of the Interior

OFFICE OF THE SECRETARY
SOUTHWEST REGION
POST OFFICE BOX 2088
ALBUQUERQUE, NEW MEXICO 87103

ER-81/1103

JUL 14 1981

Colonel Thomas A. Sands
District Engineer
Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Sands:

We have reviewed the Draft Environmental Impact Statement for Sand Dredging Operations in Lafourche Parish, near leeville, Louisiana and have the following comments.

6.1 The extent of the cultural resource study does not appear to be adequate. The study conducted by McIntire (1976) should be reviewed by the State Historic Preservation Officer (SHPO) in order to determine the adequacy of the survey work. Correspondence documenting this consultation, along with the SHPO comments, should be included in the final statement. In Louisiana the SHPO is Mr. Robert B. DeBlieux, Assistant Secretary, Department of Culture, Recreation and Tourism, Office of Program Development, P. O. Box 44247, Baton Rouge, Louisiana 70804.

RESPONSE 6.1: See comment by the Louisiana State Historic Preservat and response at page 6-22.

6.2 We suggest that the permits under Section 10 of the River and Harbor Act of 1899 and Section 404 of the Clean Water Act require that, if archaeological resources are discovered during operations, the permittee is to contact the Secretary of the Interior through the Departmental Consulting Archaeologist, Department of the Interior, Washington, D. C. 20243.

RESPONSE 6.2: See comment by the Louisiana State Historic Preservat and response at page 6-22.

6.3 The final statement should also include statements of compliance and consistency with the Louisiana Coastal Zone Management Act.

RESPONSE 6.3: See comments by the Coastal Management Section of th Department of Natural Resources and response at page 6-24.

No section on mineral resources is included in the draft statement. In addition to sand and gravel, Lafourche Parish has produced petroleum, natural gas, natural gas liquids, sulfur, and evaporites (anhydrite and halite). The sand dredging operations probably would not interfere with production or future development of any of these mineral commodities. However, it is suggested that

6.4 the final statement include a brief acknowledgement of mineral resources in the immediate area and a discussion of potential conflicts, if any.

RESPONSE 6.4: See Section 3.4.3.3 Economic Elements, paragraph 8, discussion of mineral resources in Lafourche Parish. The proposed dredging operations would not interfere with the production or futu development of any of the existing parish mineral commodities.

Thank you for the opportunity to comment on this statement.

Sincerely,

Raymond P. Churan

Raymond P. Churan
Regional Environmental Officer

Egr, 7

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
300 EAST PASCAGOULA STREET, SUITE 300
JACKSON, MISSISSIPPI 39201

June 9, 1981

IN REPLY REFER TO:
Log no. 4-3-81-142

Colonel Thomas A. Sands
Department of the Army
New Orleans District, Corps of Engineers
P.O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Sands:

This refers to the draft EIS "Sand Dredging Operations in Lafourche Parish, near Leeville, Louisiana," which we received for comment on May 28, 1981.

RESPONSE 7: Noted.

We have reviewed the portions of this document concerning endangered and threatened species and find the list of species considered for project impacts to be current, according to our information.

Due to the nature and location of the dredge and fill operations described, we concur with the conclusion that the project activities are unlikely to threaten the continued existence of any listed or proposed animal or plant species. Therefore, no further coordination with our office will be required for the project, as described. Should you anticipate any changes in project activities or location, please contact our office for further coordination on endangered species matters.

We appreciate your concern for endangered species.

Sincerely,

Dennis B. Jordan

acting for Gary L. Hickman
Area Manager

cc: RD, FWS, Atlanta, GA (ARD-FA/SE)
ES, FWS, Lafayette, LA
Louisiana Department of Wildlife and Fisheries
New Orleans, LA

8

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
750 FLORIDA STREET
BATON ROUGE, LOUISIANA 70801

REGION 6

June 8, 1981

IN REPLY REFER TO
Draft Environmental Impact Statement
"Sand Dredging Operations in Lafourche
Parish, Near Leeville, Louisiana."
LMNOD-SA

Colonel Thomas A. Sands, CE
District Engineer
Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Sands:

We have reviewed the subject document and have no comments.

Sincerely yours,

J. N. McDonald
Division Administrator

RESPONSE 8: Noted.

9

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
1201 ELM STREET
DALLAS, TEXAS 75270

June 30, 1981

Colonel Thomas A. Sands
New Orleans District Engineer
U.S. Army Corps of Engineers
P.O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Sands:

We have completed our review of the Draft Environmental Impact Statement (EIS) for the proposed sand dredging operations in Lafourche Parish, Louisiana. This EIS is prepared as a result of applications submitted to the Corps of Engineers by Mr. J. Wayne Plaisance and Mr. Marco J. Picciola III. These applicants propose to mine sand from deposits beneath brackish marsh areas within Lafourche Parish. The overall objectives of the proposed action are to: provide greater socioeconomic benefits, lower material costs, reduce the potential threat to human life and safety, and minimize losses to valuable wildlife habitat. The mining operation would provide for an estimated need of 13,417,000 cubic yards of fill sand over the next 20 years for construction projects within Lafourche and Terrebonne Parishes. Approximately 180 acres of brackish marsh would be affected. Mitigation measures are provided using recommendations of both the Corps of Engineers and the applicants.

The following comments are offered for your consideration in preparation of the Final EIS:

<u>Wetlands</u>

9.1 1. The Final EIS should more adequately address compliance with *Executive Order (EO, 11990. This order recognizes the significant* values provided by wetlands and requires each Federal agency to provide leadership and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance their *natural and beneficial values. This EO establishes Federal policy* to discourage unnecessary alteration or destruction of important wetlands as contrary to public interest. Wetlands considered to *perform functions important to the public include:*

   a. Wetlands which serve important natural biological functions, including food chain production, general habitat, nesting, spawning, rearing, and resting sites for aquatic or land species;

RESPONSE 9.1: Section 1(b) of Executive Order (EO) 11990 specifically "the issuance by Federal agencies of permits, licenses, or allocations *private parties for activities involving wetlands on non-Federal proper* is not a requirement to establish the compliance or non-compliance of th proposed projects with EO 11990.

The discussion of the environmental setting of the proposed project are Section 3.4.2 adequately discusses the value of the wetlands as wildlife fisheries habitat. Other functions and values of these wetlands are al adequately discussed. However, Section 3.4.2 <u>Environmental Setting</u> has revised somewhat to point out the values of the affected wetlands per th criteria set forth in regulations at 33CFR 320.4(b).

b. Wetlands set aside for study of the aquatic environment or as sanctuaries or refuges;

c. Wetlands the destruction or alteration of which would affect detrimentally the natural drainage characteristics, sedimentation patterns, salinity distributions, flushing characteristics, current patterns, or other environmental characteristics;

d. Wetlands which are significant in shielding other areas from wave action, erosion or storm damage;

e. Wetlands which serve as valuable storage areas for storm and floodwaters;

f. Wetlands which are prime, natural recharge areas, and;

g. Wetlands which through natural water filtration processes serve to purify water.

The Draft EIS indicates the proposed sand dredging proposal would impact approximately 180 acres over a 20-year period. In accordance with EO 11990 and the established wetland policy, we believe for the EIS to adequately address overall wetland consideration, the Final Statement should evaluate the extent of impact relative to the above public interest criteria. Once this area of impact assessment is completed, the Final EIS should provide a substantiated conclusion summarizing either compliance or non-compliance to the EO policy directives.

Recommendations

Based upon the information and the alternatives presented in the Draft EIS, EPA has environmental reservations to the proposed plan of action. We offer the following recommendations to be considered by the Corps in developing permit conditions to the applicants' proposal. Our recommendations are as follows:

9.2 1. In the event hydraulic dredges are used, we recommend the applicants construct perimeter levees around the mining pits, pump the dredge material into the existing pits, and return the water from the settling pit to the original dredging pit. The applicants should recognize that EPA may require a National Pollutant Discharge and Elimination System (NPDES) permit for these operations.

9.3 2. We strongly recommend that detaining pits not be constructed on the Chenier ridges. We consider the Chenier ridges as unique and valuable wildlife habitat and every effort should be made to protect these areas from unnecessary destruction.

3. We strongly recommend that fifty (50) foot gaps be cut into the perimeter levees every 500 feet following completion of the project.

RESPONSE 9.2: Both applicants have agreed to accept these recommen levee construction and pumping, and if permits are issued, they will conditioned to reflect these modifications.

RESPONSE 9.3: Because the chenier ridges are nonwetlands, the US Ar Engineers has no jurisdictional authority over these areas. However Coastal Zone Management Plan of the State of Louisiana, the applica required to obtain a Coastal Use Permit from the Louisiana Departme Natural Resources in order to perform work on the cheniers.

9.4 4. We recommend that the incremental mining of 8 acres per pit excavation be rigidly adhered to. We believe this to be the most environmentally acceptable method.

RESPONSE 9.4: The incremental mining of eight acres per pit
will be made a condition of any permit issued and will be str

9.5 5. We suggest that the project be implemented in such a manner so that established oyster populations identified near the project site are not adversely impacted.

RESPONSE 9.5: Louisiana Wildlife and Fisheries will be co
any necessary steps to protect established oyster population
area.

These comments classify your Draft EIS as ER-2. Specifically, we are expressing environmental reservations in view of the anticipated impacts to wetland resources. However, in consideration of the alternatives, their associated impacts, and the successful implementation of the above recommendations, we consider the proposed plan to be the most environmentally sound plan and economical source of sand for the continued development in Lafourche Parish. Our classification will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions, under Section 309 of the Clean Air Act.

Definitions of the categories are provided on the enclosure. Our procedure is to categorize the EIS on both the environmental consequences of the proposed action and on the adequacy of the EIS at the draft stage, whenever possible.

We appreciated the opportunity to review the Draft EIS. Please send our office five (5) copies of the Final EIS at the same time it is sent to the Office of Federal Activities, U.S. Environmental Protection Agency, Washington, D.C.

Sincerely,

Frances E. Phillips

Frances E. Phillips
Acting Regional Administrator

Enclosure

Operations Div 1C

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON 20426

IN REPLY REFER TO

June 11, 1981

Mr. Thomas A. Sands
Colonel, CE
District Engineer
U.S. Department of the Army
P.O. Box 60267
New Orleans, Louisiana 70160

Dear Mr. Sands:

I am replying to your request to the Federal Energy Regulatory Commission for comments on the Draft Environmental Impact Statement for the Sand Dredging Operations in LaFourche Parish, near Leeville, Louisiana. This Draft EIS has been reviewed by appropriate FERC staff components upon whose evaluation this response is based.

RESPONSE 10: Noted.

This staff concentrates its review of other agencies' environmental impact statements basically on those areas of the electric power, natural gas, and oil pipeline industries for which the Commission has jurisdiction by law, or where staff has special expertise in evaluating environmental impacts involved with the proposed action. It does not appear that there would be any significant impacts in these areas of concern nor serious conflicts with this agency's responsibilities should this action be undertaken.

Thank you for the opportunity to review this statement.

Sincerely,

JMHeinemann
Jack M. Heinemann
Advisor on Environmental Quality

11

STATE OF LOUISIANA

DEPARTMENT OF CULTURE, RECREATION AND TOURISM

OFFICE OF PROGRAM DEVELOPMENT

DAVID C. TREEN
Governor

ROBERT B. DeBLIEUX
Assistant Secretary

MRS. LAWRENCE H. FOX
Secretary

June 29, 1981

Colonel Thomas A. Sands
District Engineer
Department of the Army
New Orleans District, Corps of Engineers
P.O. Box 60267
New Orleans, LA 70160

Re: LMNOD-SA(Lafourche Parish Wetlands)66
(Lafourche Parish Wetlands)81
(Lafourche Parish Wetlands)139
Draft Environmental Impact Statement, Lafourche Parish, Louisiana

Dear Colonel Sands:

My staff has reviewed the above-referenced document at your request and we do not feel that any significant cultural resources will be impacted by the proposed projects. Therefore, we have no objections to the project's implementation.
11.1 However if any archaeological remains are encountered during construction, the work should be halted and this office contacted immediately.

If we may be of further assistance, please do not hesitate to contact this office.

Sincerely,

Robert B. DeBlieux
State Historic Preservation Officer

RBD/JEK/tdl

RESPONSE 11.1: If permits are issued for either one or both [illegible] sand dredging projects, special conditions will be added to [illegible] applicants to cease operations and to advise the State Histor[illegible] Officer if archaeological remains are encountered.

DIVISION OF ARCHAEOLOGY AND HISTORIC PRESERVATION
P.O. Box 44247 Baton Rouge, La. 70804 504 342-[illegible]

State of Louisiana

FRANK A. ASHBY, JR.
SECRETARY

JAMES M. HUTCHISON
DEPUTY SECRETARY

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF STATE LANDS

MICHAEL BOURGEOIS
DIRECTOR

July 15, 1981

Colonel Thomas A. Sands
District Engineer
Department of the Army
New Orleans District Corps of Engineers
P. O. Box 60267
New Orleans, LA 70160

Dear Colonel Sands:

This office is in receipt of the D.E.I.S. entitled "Sand Dredging Operations in Lafourche Parish near Leeville, Louisiana", May, 1981. The following comments constitute the position of our office toward this document and the projects it describes.

To summarize, the D.E.I.S. states that there is a need in Lafourche Parish and nearby Terrebonne Parish for sand filling materials. The D.E.I.S. also describes alternate sources from which to obtain these materials. The first alternative (the one the applicants have submitted permit applications to perform) would be to obtain the sand by dredging it from brackish wetland habitat. Another alternative would be to obtain the sand from chenier ridges in the area. The final alternative to be addressed by this office (since the no action and existing pit alternatives would not provide needed sand, this office will not address them) would be to provide this sand from the Mississippi River.

To begin, this office takes issue with the data on page viii in the table "Relationship of the Proposed Sand Dredging to Environmental and Statutory Requirements" which shows Louisiana Coastal Zone Management act is not applicable in the case of the proposed sand dredging projects. The Louisiana Coastal Zone Management Act does apply to the proposed projects and to one of the proposed alternates - chenier dredging. Discussion of the applicability of the State and Local Coastal Resources Act of 1978 (Act 361) to the proposed projects and the chenier dredging alternative is discussed below.

The Proposed Projects

The proposed projects would involve dredging sand from under brackish wetlands and would result in the permanent adverse alteration of 180 acres of these wetlands. This office regards such alterations as significant and

POST OFFICE BOX 44396 . BATON ROUGE, LOUISIANA 70804
NATURAL RESOURCES BUILDING

under the consistency provisions of the Coastal Zone Management Act of 1972, P.L. 92-583 Sec. 307(c)3, requests that the applicants furnish statements
12.1 to this office that their proposed projects are consistent with the Louisiana Coastal Management Program. To quote Sec. 307(c)3, "no license or permit shall be granted by the Federal Agency until the State of its designated agency has concurred with the applicant's certification..."

RESPONSE 12.1: The applicants have been made aware of the need for consi statements and both have submitted same.

Dredging Chenier Ridges as a Source of Sand

The dredging of a chenier ridge for the purpose of obtaining sand is an activity which would not require a permit under Section 404. Therefore, neither the Picciola or Plaisance interests would need to apply to the Corps of Engineers to dredge cheniers for sand.

However, the chenier ridges in the proposed project area (as shown on page 3-11 of the D.E.I.S.) are within the Louisiana Coastal Zone Boundary and are subject to the regulations established by Act 361. This office, the Coastal Management Section of the Department of Natural Resources, administers the Coastal Use Permitting Program.

Because this office has not received an application for a Coastal Use Permit to dredge the cheniers in the project area, it cannot now state definitely that it would determine that a permit was needed to perform such an activity. However, Subsection 213.11A of Act 361 states in part that "no person shall commence a use of state or local concern without applying for and receiving a Coastal Use Permit..."

It would appear likely that this office would require a permit for a chenier dredging project since the Rules and Procedures for Coastal Use Permits, Part 1B (2)n specifically states that "activities which impact barrier islands, salt domes, cheniers, and beaches are uses of state or local concern subject to the permitting requirement". Therefore, any person proposing to dredge cheniers within the boundaries of the Louisiana Coastal Zone is required to submit a permit applica-
12.2 tion to this office. This office would then determine whether a permit would be required for that particular activity.

RESPONSE 12.2: A statement as to the *possible* need for a coastal use p has been added to the chenier ridge discussion.

Mississippi River Sand as a Sources of Sand

The Mississippi River is currently a major source of sand for southeastern Louisiana and there is now an existing sand dredging industry that uses the Mississippi River as its source. The environmental impacts associated with sand dredging are minimal when compared to those associated with the two alternatives already discussed.

However, the high cost of transporting such river derived sand from the nearest source - Hahnville, LA - is a serious issue. The D.E.I.S. estimates the cost of hauling sand from Hahnville to sites in Lafourche Parish at between $6.75 and $9.00 per cubic yard, depending upon whether the sand was trucked the entire distance or barged part of the way.

It seems likely, however, that this cost could be reduced by purchasing sand in quantity, barging it to Lafourche Parish, and stockpiling it in a centrally

located area. It is possible that such a stockpile area would be located in wetland, and thus be subject to Corps' Section 404 Permitting authority. Also, since most of Lafourche Parish is within the Coastal Zone Boundary, such a stockpile area would almost certainly require a Coastal Use Permit (CUP).

However, utilizing this method would possibly reduce the cost of sand per cubic yard, and depending upon the stockpiling site selected, have a less dramatic impact on coastal wetlands than either of the other two alternatives discussed.

In comparison to the option of hauling sand by truck directly from Hahnville to a work site in Lafourche Parish, the stockpiling method would reduce the number of truck trips necessary and thereby reduce the usage of fossil fuel, highway wear and tear, and the probability for increased highway accidents.

12.3 It is the opinion of this office that the option of utilizing sand dredged from the Mississippi River to fill Lafourche Parish need for sand should be more thoroughly investigated. It would appear to be a viable, if somewhat more expensive method in the short term to provide Lafourche Parish with needed sand. In the long term, Lafourche Parish, which has a high average annual erosion rate, may find that removal of large sections of its storm buffering and errosion resistant wetlands or cheniers for the purpose of providing sand for fill to be very expensive.

Sincerely,

Joel L. Lindsey

Joel Lindsey
CZM/Administrator

JL/dba

RESPONSE 12.3: The suggested alternative of barging Mississippi Rive[illegible] Lafourche Parish and stockpiling it there for later distribution as [illegible] been addressed in Section 2. Alternatives, and in Section 4. Enviro[illegible] Consequences.

State of Louisiana

FRANK A. ASHBY, JR.
SECRETARY

DEPARTMENT OF NATURAL RESOURCES

B. JIM PORTER
ASSISTANT SECRETARY

OFFICE OF ENVIRONMENTAL AFFAIRS

May 29, 1981

Col. Thomas A. Sands
District Engineer
Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

RE: Sand Dredging Operations in Lafourche Parish
LMNOD-SA(Lafourche Parish Wetlands)66
LMNOD-SA(Lafourche Parish Wetlands)81
LMNOD-SA(Lafourche Parish Wetlands)139

Dear Col. Sands:

The above referenced matter concerning environmental quality has been received and reviewed by the administrative staff within the Office of Environmental Affairs, Department of Natural Resources. From the information contained in the package sent to our office, the administrative staff issues a no objection on this particular project. The rules and regulations governing this project should continue to be in full compliance with all State and Federal regulatory agencies.

RESPONSE 13: Noted.

We appreciate this opportunity to participate in the review process.

Sincerely,

WILLIAM J. MOLLERE
Chief Administrative Officer
Office of Environmental Affairs

WJM:ala

P.O BOX 44066 . BATON ROUGE, LOUISIANA 70804 . PHONE 504/342-1265

14

State of Louisiana

FRANK A. A..IBY, JR.
SECRETARY

DEPARTMENT OF NATURAL RESOURCES
OFFICE OF FORESTRY
(LOUISIANA FORESTRY COMMISSION)

D.L. McFATTER
ASSISTANT SECRETARY AND
STATE FORESTER

May 29, 1981

Col. Thomas A. Sands, CE
District Engineer
Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Col. Sands:

Reference the DEIS on the Sand Dredging Operation in Lafourche Parish near Leeville, Louisiana.

It appears that there is no commercial forestlands involved. Therefore, we have no comment to offer in this regard.

We do appreciate the opportunity to review the proposed project.

Sincerely,

W. D. MERCER - ASSOCIATE STATE FORESTER

GAR

RESPONSE 14: Noted.

15

LOUISIANA DEPARTMENT OF WILDLIFE AND FISHERIES

WILDLIFE AND FISHERIES BUILDING
400 ROYAL STREET
NEW ORLEANS, LOUISIANA 70130

SEAFOOD DIVISION
(504) 568-5675

SURVEY SECTION
(504) 568-5631

June 23, 1981

MEMORANDUM

TO: Mr. Harry Schafer, Chief, Seafood Division

FROM: Mike Windham, Coastal Use Permit Section

SUBJECT: Draft Environmental Impact Statement--Sand Dredging Operations in Lafourche Parish near Leeville

After reviewing the above-referenced DEIS, and considering the extent of productive marsh permanently impacted, it is my opinion that the Mississippi River alternative, coupled with use of existing pits, is the least environmentally damaging and most practical option.

The above option would eliminate the dredging of 180 acres of fishery nursery grounds which is also habitat for a variety of wildlife (game and non-game) resources.

The negative aspects of the Mississippi River alternative are chiefly highway safety, economics, and increased pressures to dredge Chenier ridges. Highway safety and economic problems could be reduced by using barges exclusively.

It was stated that the higher cost of Mississippi River sand would increase the demand for a local source, which would result in the mining of the Chenier ridges.

Approximately 85 acres of Chenier ridges are owned by the Plaisance interest which are accessible without a Department of the Army permit.

In conversation with Coastal Zone Management Section of the Department of Natural Resources, the Chenier ridges are under CZM jurisdiction, and a permit would be necessary for any activity on these ridges. The prospect of utilizing Chenier ridges for sand excavation is unlikely, since a CZM permit would be required.

15.1 An alternative that was not discussed was the possibility of offshore sand dredging--this option should also be investigated.

Sincerely,

Mike Windham

Mike Windham

MW/jr

cc: [illegible]

RESPONSE 15.1: This alternative was considered but it was elimin[...] it is not feasible economically or legally, and it is more enviro[...] damaging.

15

LOUISIANA DEPARTMENT OF WILDLIFE AND FISHERIES

MARINE BIOLOGICAL LABORATORY
POST OFFICE BOX 37
GRAND ISLE, LOUISIANA 70358

(504) 787-2163
737-2164

SEAFOOD DIVISION

June 15, 1981

MEMORANDUM

TO: Ralph Latapie

FROM: J. E. Roussel, CSA III

SUBJECT: Draft Environmental Impact Statement of Sand Dredging Operations Near Leeville

After reviewing the E.I.S. you sent me, it is my opinion that the demand for fill sand in Terrebonne and Lafourche parishes should be supplied by utilizing existing local pits and the Mississippi River source.

Considering the alarming rate of land loss in this area, it would appear that permission to initiate activities to accelerate this rate would be unwise. Additionally, a check with survey section revealed that there are at least 11 oyster leases, covering 121 acres, within a one-mile radius of
15.2 the proposed sites, and applications for additional leases are pending. Although these leases are not in the immediate vicinity of the sites, they may still be adversely impacted by dredging activities in the area. Other considerations should include the possible reduced esthetic value of the area
15.3 due to the close proximity of the sites to both La 1 and the Wisner Wildlife Management area.

One area in which I think the E.I.S. is lacking is information concerning
15.4 the percentage of the estimated demand which can be supplied by existing pits in the area. This information, plus any documented impacts of existing pits on surrounding wetlands, should be crucial to any decision regarding increased
15.5 dredging activity in this area.

Please be aware that these comments are of an opionative nature and originate from a purely ecological standpoint.

I hope these comments will be helpful in formulating the Department's response to this issue. If you have any further questions, please give me a call.

J. E. Roussel

cc: Harry E. Schafer, Jr.
Ron Dugas

RESPONSE 15.2: See comment by the US Environmental Protection Ag response at page 6-20.

RESPONSE 15.3: The possible esthetic impacts of the proposed pr discussed in Section 4.3.1.2 Esthetic Impacts.

RESPONSE 15.4: None of the estimated demand for fill sand could existing pits because none of the existing pits are in operation time.

REPSONSE 15.5: There are no known publications which document th existing pits on surrounding wetlands in the study area.

16

Wildlife Management Institute

709 Wire Building, 1000 Vermont Ave., N.W., Washington, D.C. 20005 • 202 / 347-1774

DANIEL A. POOLE
President
L. R. JAHN
Vice-President
L. L. WILLIAMSON
Secretary
JACK S. PARKER
Board Chairman

PLEASE REPLY TO:
Murray T. Walton
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June 17, 1981

Colonel Thomas A. Sands
U.S. Army Corps of Engineers
P.O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Sands:

The Wildlife Management Institute has reviewed the Draft Environmental Statement, Sand Dredging Operations in Lafourche Parish, Near Leeville, Louisiana dated May, 1981. This document dwells on the direct impacts of the proposed action (sand dredging from wetlands) and several alternatives.

Although the direct losses of fish and wildlife habitat are relatively small from excavation of wetlands as proposed or mining of cheniers (a unique habitat type especially valuable to migrating birds), the indirect effect of increased availability and lower cost of sand may have considerable indirect adverse impacts on fish and wildlife habitat and prime farmland.

Table 3.4-1 (page 3-28) demonstrates considerable human population growth in Lafourche Parish. Also, page 3-32 indicates a significant loss of agricultural land in Lafourche Parish in the last 5 years - 3,500 to 4,000 acres. The Parish is predominately wetlands and in a region subject to flooding by hurricanes.
16.1 What purpose is served by making structural development and human population growth more feasible (economically) in Lafourche Parish? The externalities have not been evaluated.

16.2 In regard to sand dredging in the Mississippi River, what benefits accrue for navigation and reduced maintenance dredging?

16.3 If the proposed alternative of sand dredging from wetlands is approved, the Institute supports the mitigation measures 2.10.1 on page 2-6 and 2.10.4 on page 2-7 to restore water control structures on the Wisher Wildlife Management Area and to donate adjacent tracts of marsh.

Thank you for the opportunity to comment on this document.

Sincerely,

Murray T. Walton
Southcentral Representative

DEDICATED TO WILDLIFE SINCE 1911

RESPONSE 16.1: Although the proposed projects would not in themsel[...] structural development and human population growth in Lafourche Par[...] feasible economically, other industrial development, particularly th[...] oil industry, would continue to attract people to the parish and en[...] structural development. Furthermore, the US Army Corps of Engineer[...] ongoing project to construct hurricane protection levees in Lafourc[...]

RESPONSE 16.2: The dredging of any amount of sand from the Mississ[...] would benefit navigation and reduce the need for maintenance dredgi[...] the less than 1,000,000 cubic yards of sand that would be dredged f[...] river each year to meet the projected requirements would be much le[...] 15,000,000 cubic yards removed each year below New Orleans for navi[...] maintenance by the US Army Corps of Engineers. No maintenance dre[...] by the US Army Corps of Engineers in that part of the river from wh[...] would be removed for use in the defined area.

RESPONSE 16.3: See comment by the USDA Soil Conservation Service [...] at page 6-8.

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APPENDIX A

Vegetation of Mississippi River Batture (a)

TABLE A-1

Density, frequency, and percentage compositions of each species on the batture was determined. Points were recorded only from the point of high water contact to the Mississippi River using 18 transects and hitting 247 points.

Species	Density	Frequency	Percent
Alternanthera philoxeroides . . .	0.05	5.5	0.4
Amaranthus sp	0.05	5.5	0.4
Ambrosia trifida	0.05	5.5	0.4
Ammannia coccinea	0.05	5.5	0.4
Ampelopsis arborea	0.44	37.7	3.1
Apoios pilosus	0.05	11.1	0.8
Aster pilosus	1.17	44.4	8.2
Boehmeria cylindrica	0.22	5.5	1.6
Brunnichia cirrhosa	0.16	5.5	1.2
Campsis radicans	1.05	44.4	7.5
Celtis laevigata	0.38	22.2	2.7
Cynodon dactylon	0.38	22.2	2.7
Cyperus sp.	0.05	5.5	0.4
Desmanthus illinoensis	0.05	5.5	0.4
Diodia virginiana	0.05	5.5	0.4
Eclipta alba	0.16	16.6	1.2
Equisetum prealtum	0.05	5.5	0.4
Eragrostis hypnoides	0.05	5.5	0.4

(a) Source: Montz, G. N., 1970. Ecological Study of the Flora of East St. Charles Parish, Louisiana. L.S.U., Baton Rouge, La. unpublished dissertation.

Table A-1 continued.

Species	Density	Frequency	Percent
Eragrostis reptans	0.05	5.5	0.4
Euphorbia sp.	0.05	5.5	0.4
Fimbristylis vahlii	0.05	5.5	0.4
Ipomoea sp.	0.44	33.3	3.1
Jussiaea leptocarpa	0.11	11.1	0.8
Lippia lanceolata	0.16	16.6	1.2
Marchantia sp.	0.11	5.5	0.8
Mazus japonicus	0.05	5.5	0.4
Mimosa strigillosa	0.16	11.1	1.2
Morus rubra	0.11	11.1	0.8
Panicum capillare	0.11	11.1	0.8
Panicum gymnocarpon	0.11	5.5	0.8
Paspalum fluitans	0.16	16.6	1.2
Platanus occidentalis	0.22	16.6	1.6
Pluchea purpurascens	0.27	16.6	1.9
Populus deltoides	0.27	22.2	1.9
Rhus radicans	0.89	22.2	6.3
Rubus spp.	0.38	27.7	2.7
Salix interior	1.22	72.2	8.6
Salix nigra	2.22	50.0	15.7
Sesbania exaltata	0.33	16.6	2.3

Table A-1 continued.

Species	Density	Frequency	Percent
Solanum carolinese	0.22	22.2	1.6
Solidago sp.	0.05	5.5	0.4
Sorghum halapense	0.78	33.3	5.5
Spilanthes americana	0.11	5.5	0.8
Verbena spp.	0.22	16.6	1.6
Xanthium spp.	* 0.55	37.7	3.9

TABLE A-2

Density, frequency, and percentage composition of each species on the batture was determined using all transects recorded. There were 31 transects which hit 696 points.

Species	Density	Frequency	Percent
Acer drummondii	0.03	3.2	0.1
Alternanthera philoxeroides	0.42	16.1	1.9
Amaranthus sp.	0.06	6.5	0.3
Ambrosia trifida	0.45	25.8	2.0
Ammannia coccinea	0.03	3.2	0.1
Ampelopsis arborea	0.80	51.6	3.6
Andropogon glomeratus	0.03	3.2	0.1
Apios americana	0.09	9.7	0.4
Aster pilosus	0.64	25.8	2.9
Baccharis halimifolia	0.03	3.2	0.1
Boehmeria cylindrica	0.13	6.5	0.6
Brunnichia cirrhosa	0.35	12.9	1.6
Campis radicans	0.93	48.4	4.2
Carex xrus-corvi	0.03	3.2	0.1
Carya illinoensis	0.16	16.1	0.7
Celtis laevigata	1.03	48.4	4.6
Cornus drummondii	0.32	22.6	1.4
Cynodon dactylon	0.16	12.9	0.7
Cyperus sp.	0.03	3.2	0.1

Table A-2 continued.

Species	Density	Frequency	Percent
Daubentonia texana	0.03	3.2	0.1
Desmanthus illinoensis	0.03	3.2	0.1
Diodia virginiana	0.03	3.2	0.1
Dryopteris normalis	0.03	3.2	0.1
Eclipta alba	0.09	9.7	0.4
Elymus canadensis	0.03	3.2	0.1
Equisetum prealtum	1.16	45.2	5.2
Eragostis hypnoides	0.03	3.2	0.1
Eragrostis reptans	0.03	3.2	0.1
Eupatorium serotinum	0.22	9.7	1.0
Euphorbia sp.	0.03	3.2	0.1
Fimbristylis vahlii	0.06	6.5	0.3
Forestiera acuminata	0.03	3.2	0.1
Hibiscus lasiocarpos	0.03	3.2	0.1
Hibiscus trinonum	0.03	3.2	0.1
Ipomoea spp.	0.29	22.6	1.3
Iva ciliata	0.03	3.2	0.1
Iva frutescens	0.13	9.7	0.6
Iva xanthifolia	0.22	9.7	1.0
Jussiaea leptocarpa	0.06	6.5	0.3
Justicia lanceolata	0.13	9.7	0.6

Table A-2 continued.

Species	Density	Frequency	Percent
Lactuca spp.	0.35	19.4	1.6
Lippia lanceolata	0.09	9.7	0.4
Marchantia sp.	0.06	3.2	0.3
Mazus japonicus	0.03	3.2	0.1
Melia azedarach	0.03	3.2	0.1
Mimosa strigillosa	0.16	12.9	0.7
Morus rubra	0.13	12.9	0.6
Myrica cerifera	0.09	9.7	0.4
Panicum capillare	0.06	3.2	0.3
Panicum gymnocarpon	0.06	3.2	0.4
Paspalum fluitans	0.09	9.7	0.4
Passiflora incarnata	0.03	3.2	0.1
Plantanus occidentalis	0.80	41.9	3.6
Polygonum sp.	0.06	6.5	0.3
Populus deltoides	0.64	35.5	2.9
Rhus radicans	1.17	58.1	7.6
Rubus sp.	0.42	29.0	1.9
Rubus spp.	1.74	67.7	7.8
Salix interior	1.38	67.7	6.2
Salix nigra	2.06	64.5	9.2
Sambucus canadensis	1.19	45.2	5.3

Table A-2 continued.

Species	Density	Frequency	Percent
Sapium sebiferum	0.03	3.2	0.1
Sesbania exaltata	0.22	12.9	1.0
Sicyos angulatus	0.03	3.2	0.1
Sida rhombifolia	0.06	6.5	0.3
Solanum carolinense	0.16	16.1	0.7
Solidago spp.	0.38	32.3	1.7
Sorghum halapense	0.61	25.8	2.7
Spilanthes americana	0.06	3.2	0.3
Teucrium candense	0.06	6.5	0.3
Verbena spp.	0.45	38.7	2.0
Vernonia altissima	0.06	6.5	0.3
Xanthuim spp.	0.045	22.6	2.0

APPENDIX B

Avifauna of Proposed Project Area

TABLE B-1

MIGRANT SPECIES OF BIRDS OBSERVED FROM 21 MARCH TO 10 MAY 1972 IN THE CAMINADA CHENIER AREA

Scientific Name:	Common Name:
Zenaida macroura	Mourning Dove
Coccyzus americanus	Yellow-billed Cuckoo
Coccyzus erythropthalmus	Black-billed Cuckoo
Chordeiles minor	Common Nighthawk
Archilochus colubris	Ruby-throated Hummingbird
Sphyrapicus varius	Yellow-bellied Sapsucker
Tyrannus tyrannus	Eastern Kingbird
Empidonax virescens	Acadian Flycatcher
Empidonax minimus	Least Flycatcher
Contopus irens	Eastern Wood Pewee
Stelqidopteryx reficollis	Rough-winged Swallow
Hirundo rustica	Barn Swallow
Progne subis	Purple Martin
Cyanocitta cristata	Blue Jay
Troglodytes aedon	Northern House Wern
Thryothorus ludovicianus	Carolina Wren
Mimus polyglottos	Northern Mockingbird
Dumetella carolinensis	Gray Catbird
Toxostoma rufum	Brown Thrasher
Hylocichla mustelina	Wood Thrush
Catharus ustulata	Swainson's Thrush
Catharus minimus	Gray-cheeked Thrush
Catharus fuscescens	Veery
Regulus calendula	Ruby-crowned Kinglet
Bombycilla cedrorum	Cedar Waxwing
Vireo griseus	White-eyes Vireo
Vireo flavifrons	Yellow-throated Vireo
Vireo olivaceus	Red-eyed Vireo
Vireo philadelphicus	Philadelphia Vireo
Mniotilta Varia	Black and White Warbler
Protonotaria citrea	Prothonotary Warbler
Limnothlypis swansonii	Swainson's Warbler
Helmitheros vermivorus	Worm-eating Warbler
Vermivora chrysoptera	Golden-winged Warbler
Vermivora pinus	Blue-winged Warbler
Vermivora peregrina	Tennessee Warbler
Vermivora celata	Orange-crowned Warbler
Parula americana	Northern Parula Warbler

Table B-1 continued.

Scientific Name:	Common Name:
Dendroica magnolia	Magnolia Warbler
Dendroica tigrina	Cape May Warbler
Dendorica coronata	Myrtle Warbler
Dendroica virens	Black-throated Green Warbler
Dendroica cerulea	Cerulean Warbler
Dendroica fusca	Blackburnian Warbler
Dendroica dominica	Yellow-throated Warbler
Dendroica pensylvanica	Chestnut-sided Warbler
Dendorica castenea	Bay-breasted Warbler
Dendroica striata	Blackpoll Warbler
Dendroica discolor	Prairie Warbler
Seiurus aurocapillus	Ovenbird
Seiurus noveboracensis	Northern Waterthrush
Seiurus motacilla	Louisiana Waterthrush
Geothylpis formosa	Kentucky Warbler
Geothylpis trichas	Common Yellowthroat
Icteria virens	Yellow-breasted Chat
Wilsonia citrina	Hooded Warbler
Setophaga ruticilla	American Redstart
Icterus spurius	Ochard Oriole
Icterus galbula	Baltimore Oriole
Molothrus ater	Brown-headed Cowbird
Piranga olivacea	Scarlet Tanager
Piranga rubra	Summer Tanager
Cardinalis cardinalis	Northern Cardinal
Pheucticus ludovicianus	Rose-breasted Grosbeak
Guiraca caerulea	Blue Grosbeak
Passerina cyanea	Indigo Bunting
Passerina ciris	Painted Bunting
Melospiza georgiana	Swamp Sparrow

Source: Mabie, 1974

TABLE B-2

PEAK NUMBER OF INDIVIDUAL WADING BIRDS/100 ACRES OBSERVED AUGUST 1973 - JULY 1974 WITH A MEAN VALUE FOR THE YEAR IN THE BRACKISH MARSH AREA ALONG BAYOU LAFOURCHE

Species:	8/22	9/20	10/25	11/29	12/21	1/30	2/22	3/29	4/26	5/13	6/26	7/30	Av.
Great Egret (*Casmerodius albus*)	8.5	15.8	6.4	18.6	2.6	7.1	.9	1.8	.7	2.4	11.8	4.2	6.7
Snowy Egret* (*Egretta thula*)	9.8	18.0	10.0	14.0	9.3	3.8	1.3	2.7	3.2	3.2	10.6	11.8	8.1
Cattle Egret (*Bubicuc ibis*)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reddish Egret*** (*Dichromanassa refescens*)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Louisiana Heron (*Hydranassa tricolor*)	4.0	10.0	1.1	1.1	2.6	1.5	4.0	.8	2.0	1.5	2.1	5.0	2.9
Little Blue Heron (*Florida caerulea*)	1.7	2.7	.9	.6	.4	.5	.3	.09	0.0	.2	2.7	1.5	.9
Great Blue Heron (*Ardea herodias*)	.09	.4	.2	.2	.2	.2	.2	0.0	0.9	0.0	0.9	.09	.14
Black-Crowned Night Heron ** (*Nycticorax nycticorax*)	0.0	.2	.3	0.0	0.0	0.0	.2	0.0	0.0	0.0	0.0	0.0	0.6
Yellow-Crowned Night Heron (*Nyctanassa violacea*)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
White ibis** (*Eudocinus albus*)	0.0	0.0	0.0	0.0	.4	0.0	0.0	0.0	0.0	0.0	5.6	.5	.5
Dark ibis Glossy (*Plegadis facinellus*) White Faced (*Plegadis chihi*)**	0.0	13.3	5.3	0.0	0.0	0.0	0.0	0.0	.6	.4	4.3	0.0	2.0

*Snowy Egret numbers also include immature Little Blue Herons
**Blue list species

Area Observed: 1,120 acres
Source: Mabie, 1976

TABLE B-3

PEAK NUMBER OF INDIVIDUAL WADING BIRDS/100 ACRES OBSERVED AUGUST 1973 - JULY 1974 WITH A MEAN VALUE FOR THE YEAR IN THE SALT MARSH AREA ALONG BAYOU LAFOURCHE

Species:	8/22	9/20	10/25	11/29	12/21	1/30	2/22	3/29	4/25	5/13	6/26	7/30	Av.
Great Egret (*Casmerodius albus*)	7.3	16.4	32.0	11.5	18.75	11.1	.7	1.1	3.9	2.5	20.5	16.0	11.8
Snowy Egret* (*Egretta thula*)	12.7	21.4	35.5	17.2	7.8	10.0	3.1	2.6	12.3	8.7	29.6	37.1	16.5
Cattle Egret (*Bubulcuc ibis*)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Redish Egret*** (*Dichromanassa rufescens*)	0.0	0.0	0.0	0.7	0.0	.03	.03	0.0	0.0	.03	0.0	0.0	.01
Louisiana Heron (*Hydranassa tricolor*)	2.8	8.6	10.2	2.9	14.9	5.0	3.6	.9	1.4	2.9	8.3	0.0	5.9
Little Blue Heron (*Florida caerulea*)	1.1	3.6	1.8	.7	.4	.03	.07	.07	.07	.07	.5	.3	.73
Great Blue Heron (*Ardea herodias*)	.2	.2	.5	.5	.8	1.0	1.3	.4	.1	.03	.1	.07	.44
Black-Crowned Night Heron ** (*Nycticorax nycticorax*)	.1	.07	.07	.4	.9	.07	0.0	.2	.07	.07	0.0	.03	.16
Yellow-crowned Night Heron (*Nyctanassa violacea*)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
White ibis** (*Eudocinus albus*)	3.6	.2	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	5.2	1.1
Dark ibis Glossy (*Plegadis facinellus*) White Faced (*Plegadis chihi*)**	.4	6.3	1.3	1.9	0.0	0.0	.03	0.0	.4	.3	2.4	6.4	1.6

*Snowy Egret numbers also include immature Little Blue Herons
**Blue list species

Area Observed: 2,720 acres
Source: D. W. Mabie, unpublished ms.

TABLE B-4

PEAK NUMBER OF INDIVIDUAL WATERFOWL SPECIES/100 ACRES OBSERVED AUGUST 1973 - JULY 1974 WITH A MEAN VALUE FOR THE YEAR IN BRACKISH MARSH AREAS IN BARATARIA BASIN

Species	8/22	9/22	10/25	11/29	12/21	1/30	2/22	3/39	4/26	5/13	6/26	7/30	Av.
Mallard *Anas platyrhynchos*	0.0	.53	7.5	1.0	2.7	10.7	.17	0.0	0.0	0.0	0.0	0.0	1.9
Mottled Duck* *Anas fulvigula*	1.0	4.1	6.7	1.2	3.1	.7	1.7	.71	1.8	1.1	.26	.89	1.9
Gadwall* *Anas strepera*	0.0	0.0	23.9	.17	13.4	40.5	26.7	3.3	0.0	0.0	0.0	0.0	8.9
Pintail* *Anas acuta*	0.0	0.0	0.0	1.0	2.1	5.3	0.0	0.0	0.0	0.0	0.0	0.0	.7
Green-Winged Teal *Anas crecca*	0.0	1.0	0.0	0.0	26.7	18.6	0.0	0.0	0.0	0.0	0.0	0.0	3.9
Blue-Winged Teal *Anas discors*	9.9	16.1	102.5	27.1	3.5	26.7	21.4	15.3	3.2	.08	0.0	.89	18.9
American Wigeon *Anas americana*	0.0	0.0	13.2	0.0	13.4	26.7	16.7	4.5	0.0	0.0	0.0	0.0	6.2
Shoveller* *Anas clypeata*	0.0	0.0	0.0	0.0	0.0	4.5	.71	0.0	0.0	0.0	0.0	0.0	.43
Lesser Scaup** *Aythya affins*	0.0	0.0	0.0	0.0	23.9	28.6	20.7	8.2	3.4	0.0	0.0	0.0	7.1
Red Head** *Aythya americana*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red-Breasted Merganser** *Mergus serrator*	0.0	0.0	0.0	0.0	.44	1.3	6.7	2.4	0.0	0.0	0.0	0.0	.09
Coot*** *Fulica americana*	0.0	.17	2.1	3.4	35.7	31.2	26.8	0.0	0.0	0.0	0.0	0.0	8.3

*Puddle Ducks
**Diving Ducks
***Coots

Area observed: 1,120 acres
Source: D. W. Mabie, unpublished ms.

TABLE B-5

PEAK NUMBER OF INDIVIDUAL WATERFOWL SPECIES/100 ACRES OBSERVED AUGUST 1973 - JULY 1974 WITH A MEAN VALUE FOR THE YEAR IN SALT MARSH AREAS IN BARATARIA BASIN

Species	8/22	9/22	10/25	11/29	12/21	1/30	2/22	3/29	4/26	5/13	6/26	7/30	Av.
Mallard *Anas platyrhynchos*	0.0	2.4	.07	1.3	4.0	1.3	2.2	0.0	0.0	0.0	0.0	0.0	.9
Mottled Duck* *Anas fulvigula*	.03	.44	.88	.40	.69	.55	.73	.18	.22	.14	.22	.25	.4
Gadwall* *Anas acuta*	0.0	0.0	0.0	5.0	13.9	6.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1
Pintail* *Anas crecca*	0.0	0.0	0.0	0.0	5.3	90.6	32.5	0.0	0.0	0.0	0.0	0.0	10.7
Blue-Winged Teal *Anas discors*	.4	6.8	19.5	17.6	17.5	18.0	4.5	8.6	1.[illegible]	0.0	0.0	0.0	7.3
American Wigeon *Anas americana*	0.0	0.0	.11	21.5	27.7	23.1	3.6	2.6	0.0	0.0	0.0	0.0	6.6
Shoveller* *Anas clypeata*	0.0	0.0	.03	1.8	4.7	3.8	4.4	1.3	0.0	0.0	0.0	0.0	1.3
Lesser Scaup** *Aythya affinis*	0.0	0.0	0.0	1.4	15.8	56.5	14.8	.66	1.9	.14	0.0	0.0	7.6
Red Head** *Aythya americana*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red-Breasted Merganser** *Mergus serrator*	0.0	0.0	0.0	0.0	5.8	3.4	1.5	.25	.07	.11	0.0	0.0	.92
Coot*** *Fulica americana*	0.0	0.0	.44	.33	1.28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.17

*Puddle Ducks
**Diving Ducks
***Coots

Area observed: 2,720 acres
Source: D. W. Mabie, unpublished ms.

APPENDIX C

FISH, BENTHIC SPECIES, AND ZOOPLANKTON OF THE PROPOSED PROJECT AREA

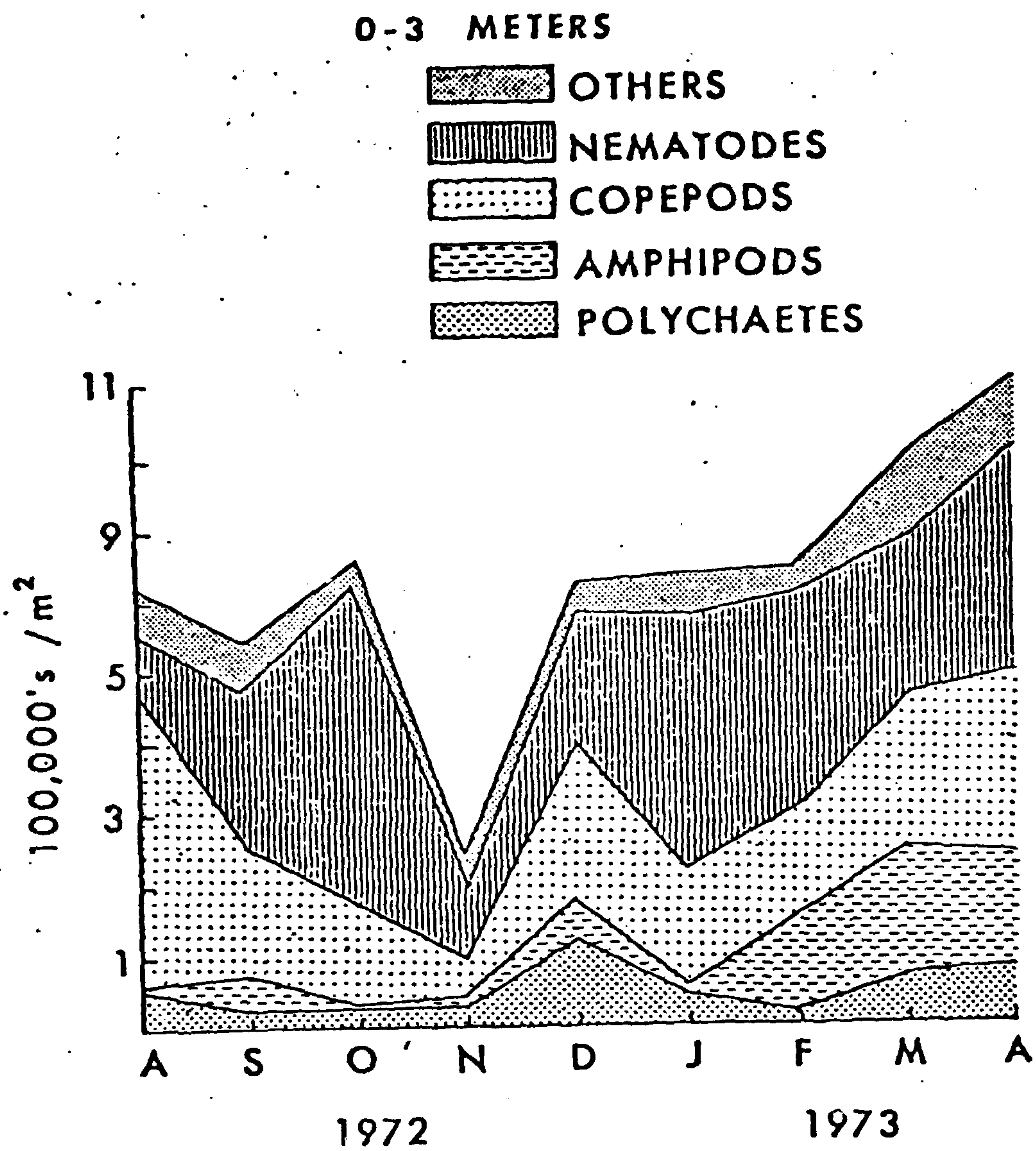
Table C-1 lists those species of fish found in the salt and brackish marsh types in the Barataria Basin. Table C-2 lists those species caught by trawl and seine in the project area during the LOOP study.

In a study conducted in 1974, Thomas (1976) found 10 species of benthic organisms in brackish water areas near to the project area, including decapods, pelecypods, and amphipods. Diversity was low when compared to other regions studied at the same time -- fresh marshes had 26 species, while salt marshes had 19 species. Consultants hired by the Picciola interests conducted a study on 12 May 1978 and found the following organisms: south of La. 2 - Chironomus sp. (17,544/m^2), polychaetes (516/m^2), Gammarus sp. and Palaemonetes vulgaris (258/m^2, each); north of La. 1 - polychaetes (258/m^2). On 20 May 1978, samples were taken from two existing borrow pits near the proposed site. One of the pits, allowed to fill with water in September 1977, was sampled at a depth of 28 feet. The other pit sampled is 8 feet deep. As expected, due to anoxic conditions no benthic organisms were found.

Table C-3 lists species of benthic organisms found by Thomas (1976) in brackish marsh waters near the proposed project area. Table C-4 lists species of benthic organisms found by Thomas (1976) in salt marsh waters near the proposed project area. Figures C-1 - C-4 depicts seasonal populations of benthic organisms 3 meters, 50 meters, and 300 meters inland from the shore of Airplane Lake and 10 meters out from the shoreline of Airplane Lake.

Studies in 1974 (Bouchard and Turner, 1976) near the project area concluded that salinity appears to be the major factor contributing to species distribution, while population density is regulated by predation by nekton and ctenophora, duration of larval stages of meroplankton, and changes in the aquatic environment brought about by the populations themselves. Abundance and diversity are greater in fresh marshes, swamps, and saline marshes, and lowest in brackish marshes. The calanoid copepod, Acartia tonsa, is the dominant species in brackish marshes. It, as well as other zooplankters in Louisiana's estaurine areas, have peak population densities in spring and fall. Consultants hired by the applicants studied zooplankton from watered areas at the proposed project site on 12 May 1978 and found five different zooplankton south of La. 1, including Oithona brevicornis (5,000/m^3); Acartia tonsa (2,200/m^3); unidentified nauplei (1,660/m^3); Centropages furcatus (550/m^3); and Paracalanus parvus (550/m^3). The total number of food for zooplankters was 9,960/m^3. All of these are important as food for other organisms. No zooplankters were found in samples taken from a roadside ditch on the proposed site, north of La. 1, although several shrimp and crabs were caught with a dip net.

Table C-5 lists species of zooplankton found by Bouchard and Turner (1976) during the LOOP study.

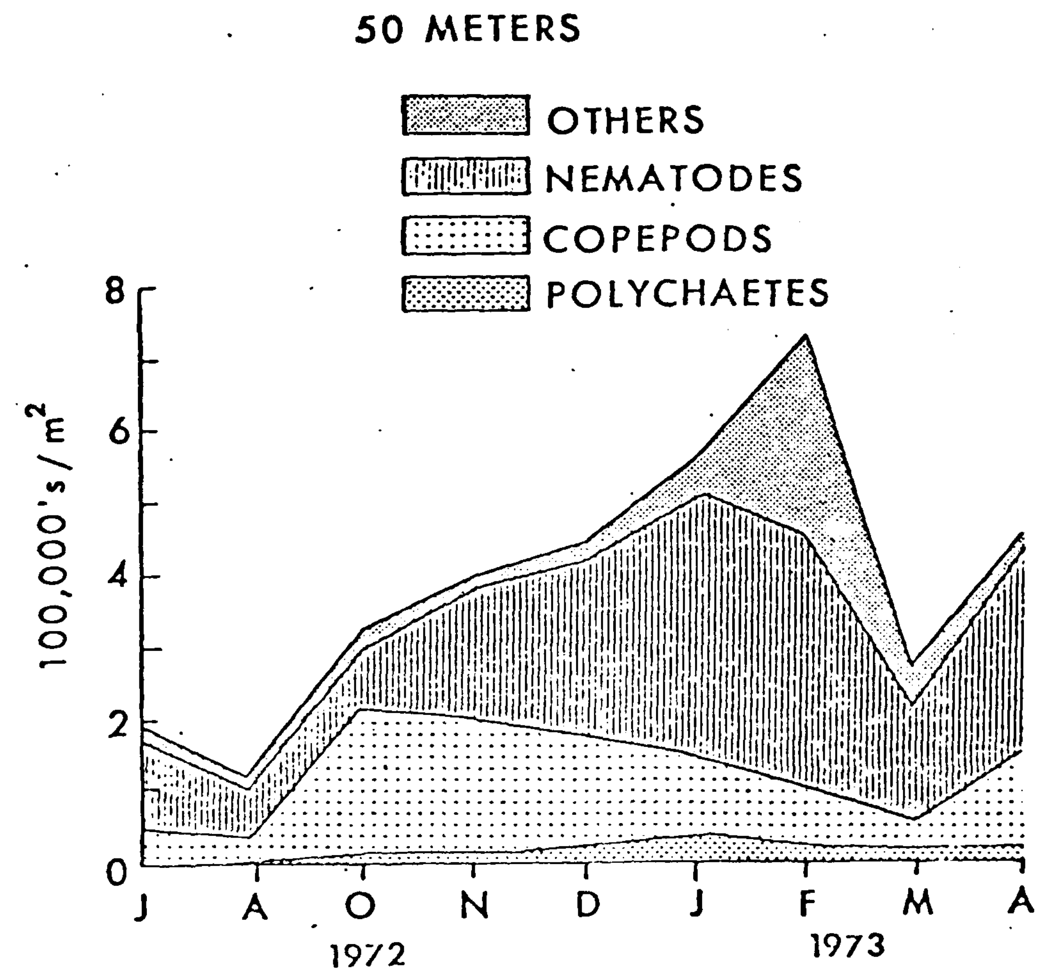


Source: Thomas, 1976.

FIGURE C-1

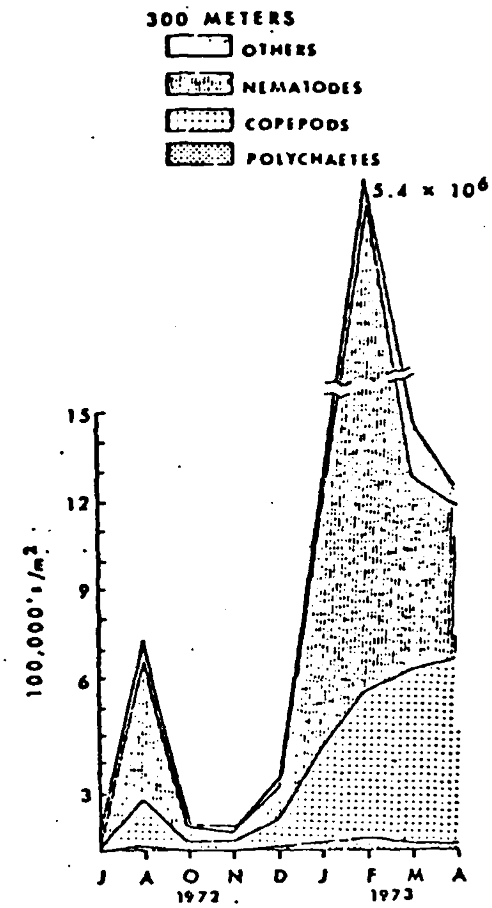
BENTHIC POPULATIONS IN THE SALT MARSH OF AIRPLANE LAKE WITHIN 3 M OF THE SHORE

SAND DREDGING OPERATIONS IN LAFOURCHE PARISH, NEAR LEEVILLE, LOUISIANA



Source: Thomas, 1976.

FIGURE C-2
BENTHIC POPULATIONS IN THE SALT MARSH 50 M INLAND FROM THE SHORE OF AIRPLANE LAKE
SAND DREDGING OPERATIONS IN LAFOURCHE PARISH, NEAR LEEVILLE, LOUISIANA

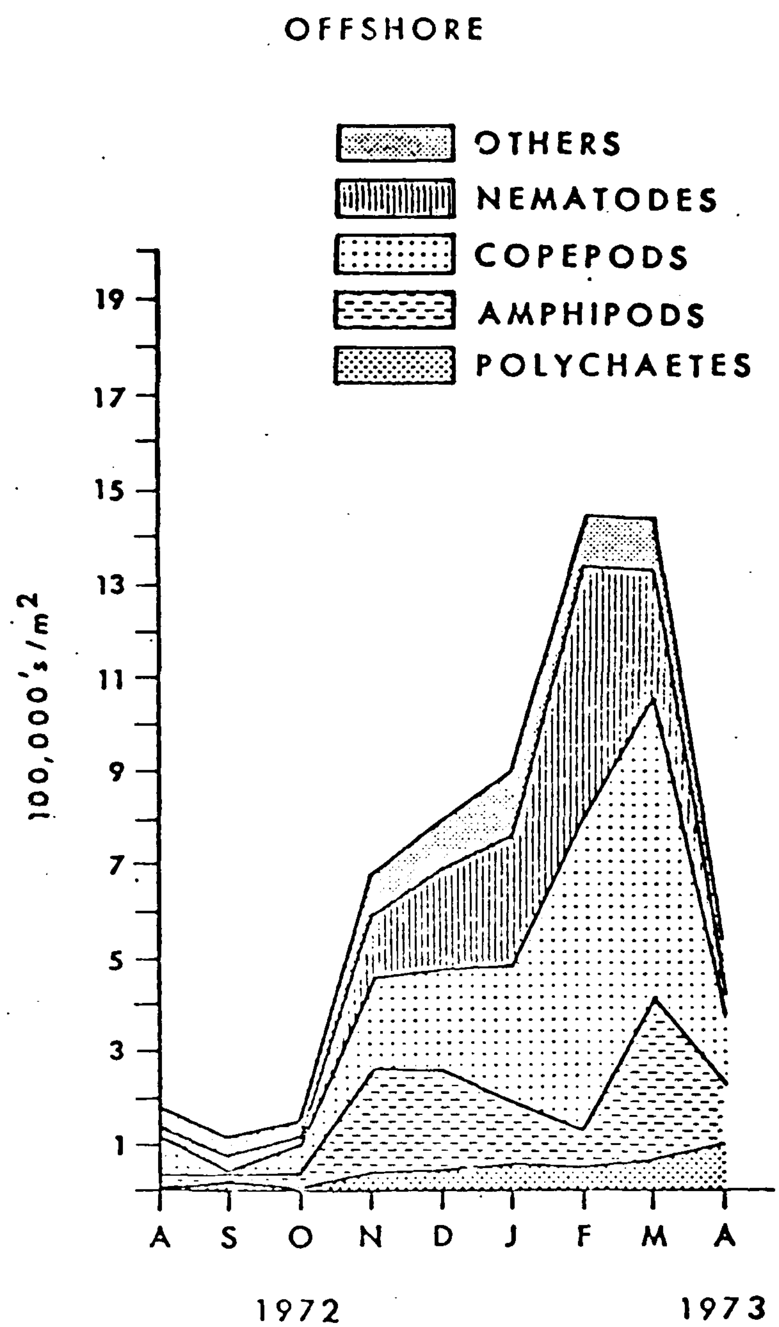


Source: Thomas, 1976.

FIGURE C-3

BENTHIC POPULATIONS IN THE SALT MARSH 300 M INLAND FROM THE SHORE OF AIRPLANE LAKE

SAND DREDGING OPERATIONS IN LAFOURCHE PARISH, NEAR LEEVILLE, LOUISIANA



Source: Thomas, 1976.

FIGURE C-4

BENTHIC POPULATIONS IN AIRPLANE LAKE
10 M OUT FROM SHORE

SAND DREDGING OPERATIONS IN LAFOURCHE
PARISH, NEAR LEEVILLE, LOUISIANA

TABLE C-1

FISH SPECIES FOUND IN THE SALT AND BRACKISH MARSH TYPES OF THE BARATARIA BAY AREA

Scientific Name:	Common Name:
Salt Marsh	
Carcharhinus leucas	Bull shark
Lepisosteus spatula	Alligator gar
Amia calva	Bowfin
Elops saurus	Ladyfish
Ophichthus gomesi	Shrimp eel
Alosa chrysochloris	Skipjack herring
Dorosoma cepedianum	Gizzard shad
Opisthonema oglinum	Atlantic thread herring
Harengula pensacolae	Scaled sardine
Anchoa hepsetus	Striped anchovy
Anchoa lyolepis	Dusky anchovy
Synodus foetens	Inshore lizardfish
Opsanus beta	Gulf toadfish
Porichhythys porosissmus	Atlantic midshipmann
Urophycis floridanus	Southern hake
Strongylura marina	Atlantic needlefish
Adinia xenica	Diamond killifish
Cyprinodon variegatus	Sheepshead minnow
Fundulus grandis	Gulf killifish
Fundulus similus	Longnose killifish
Lucanis parva	Rainwater killifish
Gambrusia affinis	Mosquitofish
Heterandria formosa	Least killifish
Poecilia latipinna	Sailfin molly
Menidia beryllina	Tidewater silverside
Syngnathus floridae	Dusky pipefish
Syngathus louisianae	Chain pipefish
Syngnathus scovelli	Gulf pipefish
Caranx hippos	Crevalle jack
Chloroscembrus chrysures	Atlantic bumper
Aligoplites saurus	Leather jacket
Selene vomer	Lookdown
Trachinotus carolinus	Florida pompano
Vomer setapinnis	Atlantic moonfish
Lutjanus griseus	Gray snapper
Eucinostomus argenteus	Spotfin majarra
Eucinostomus gula	Silver jenny
Archosargus probatacephalus	Sheepshead
Lagodon rhomboides	Pinfish
Cynoscin arenarius	Sand seatrout

Table C-1 continued.

Scientific Name:	Common Name:
Salt Marsh	
Menticirrhus americanus	Southern kingfish
Menticirrhus littoralis	Gulf kingfish
Pogonias cromis	Black drum
Stellifer lanceolatus	Star drum
Chaetodipterus faber	Atlantic spadefish
Mugil cephalis	Striped mullet
Polydactylus octonemus	Atlantic threadfin
Astroscopus y-graecum	Southern stargazer
Gobiosoma robustum	Clown goby
Trichiurus lepturus	Atlantic cutlassfish
Scombermorus maculatus	Spanish mackerel
Peprilus alepidotus	Harvest fish
Peprilus burti	Gulf butterfish
Prionotus nubio	Blackfin searobin
Prionotus tribulus	Bighead searobin
Citharichthys spilopterus	Bay whiff
Etropus crossostus	Fringed flounder
Paralightys lathostigma	Southern flounder
Archirus lineathus	Lined sole
Symphurus plagiusa	Blackcheck tonguefish
Sphoeroides parvus	Least puffer
Chilomycterus schoepfi	Striped burrfish
Brackish Marsh	
Dasyatis sabina	Atlantic stingray
Lepisosteus oculatus	Spotted gar
Lepisosteus platostomus	Shortnose gar
Elops saurus	Ladyfish
Myrophis punctatus	Speckled worm eel
Ophichtus gomesi	Shrimp eel
Alosa chrysochloris	Skipjack herring
Opisthonema oglinum	Atlantic thread herring
Harengula pensacolae	Scaled sardine
Synodus foetens	Inshore lizardfish
Arisu felis	Sea catfish
Adinia xenica	Diamond killifish
Lucania parva	Rainwater killifish
Fundulus grandis	Guld killifish
Fundulus plvereus	Bayou killifish

Table C-1 continued.

Scientific Name:	Common Name:
Brackish Marsh	
Fundulus similus	Longnose killifish
Poecilia latipinna	Sailfin molly
Membras martinica	Rough silverside
Syngnathus louisianae	Chain pipefish
Lagodon rhomboides	Pinfish
Bairdiella chrysura	Silver perch
Cynoscion nebulosus	Spotted seatrout
Leiostomus xanthurus	Spot
Pogonias cromis	Red drum
Mugil cephalus	Striped mullet
Dormitator maculatus	Fat sleeper
Gobinellus hastatus	Sharptail goby
Gobinellus shufeldi	Freshwater goby
Paralifhtys legostigma	Southern flounder

Source: Bahr and Hebrard, 1976.

TABLE C-2

SPECIES CAUGHT IN TRAWL AND SEINE IN PLAISANCE AND CLOVELLY AREAS

Species	TRAWL: Plaisance Area Trip 1	TRAWL: Plaisance Area Trip 2	TRAWL: Clovelly Area Trip 1	TRAWL: Clovelly Area Trip 2	Times Caught	SEINE: Plaisance Area Trip 1	SEINE: Plaisance Area Trip 2	SEINE: Clovelly Area Trip 1	SEINE: Clovelly Area Trip 2	Times Caught	Times Caught Trawl & Seine	Method of Collection
Penaeus aztecus	x	x	x	x	4	x	x	x	x	4	8	TS
Paneus setiferus	x	x	x	x	4	x	x	x	x	4	8	TS
Palaemonetes sp.			x		1	x		x	x	3	4	TS
Callinectes	x	x			2	x	x	x	x	4	6	TS
Achirus lineatus			x	x	2			x	1	3	TS	
Adinis xenica					0	x			1	1	S	
Amia clava					0			x	1	1	S	
Anchoa mitchilli	x	x	x	x	4	x		x	2	6	TS	
Archosargus probatocephalus	x			x	2				0	2	T	
Arius felis	x		x	x	3				0	3	T	
Bagre marinus			x		1				0	1	T	
Bairdiella chrysura					0	x	x		2	2	S	
Brevoortia patronus	x	x			2				0	2	T	
Chaetodipterus fabler	x				1				0	1	T	
Cynoscion arenarius	x	x	x	x	4				0	4	T	
C. nebulosus	x			x	2	x	x	x	3	5	TS	
Cyprinidon variegatus					0	x	x	x	x	4	4	S
Dorosoma cepedianum		x			1				0	1	T	
Elops saurus			x		1				0	1	T	
Fundulus grandis					0	x	x	x	x	4	4	S
Fundulus similis					0	x	x		2	2	S	
Gobionellus boleosoma	x				1	x		x		2	3	TS
Ictalurus			x	x	2				0	2	T	
Lagodon rhomboides	x	x			2				0	2	T	
Leiostomus xanthurus	x	x		x	3				0	3	T	
Lepomis microlophus					0			x	x	2	2	S
Lucania parva					0	x		x	x	3	3	S

Table C-2 continued.

Species	TRAWL: Plaisance Area Trip 1	TRAWL: Plaisance Area Trip 2	TRAWL: Clovelly Area Trip 1	TRAWL: Clovelly Area Trip 2	TRAWL: Times Caught	SEINE: Plaisance Area Trip 1	SEINE: Plaisance Area Trip 2	SEINE: Clovelly Area Trip 1	SEINE: Clovelly Area Trip 2	SEINE: Times Caught	Times Caught Trawl & Seine	Method of Collection
Menidia beryllina				0	x	x	x	x	4	4		S
Microfobius gulosus					0	x	x	x		3	3	S
Microgobius thalassinus					0	x			1	1	S	
Micropogon undulatus	x	x	x		3				0	3	T	
Mugil cephalus	x	x			2	x	x	x		3	3	TS
Opsanus tau		x			1				0	1	S	
Poecilia latipinna					0	x		x	x	3	3	S
Pogonias cromis	x	x			2				0	2	T	
Sciaenops ocellata	x	x			2				0	2	T	
Sphoeroides parvus	x				1				0	1	T	
Stellifer lanceolata		x			1				0	1	T	
Syngnathus sp.					0	x	x		2	2	S	
Number Species	18	15	11	10	27	19	12	13	14	22	39	

Total Caught: Trawl & Seine = 19
Trawl Only = 17
Seine Only = 13

T = Trawl
S = Seine
TS = Trawl & Seine

Source: Loesch, 1976

TABLE C-3

BENTHOS COLLECTED FROM THE BRACKISH MARSH WATERS

Phylum Nematoda
Subclass Copepoda*
Subclass Ostracoda*

Family Gammaridae
Gammarus mucronatus (Say)

Family Corophiidae
Corophium sp.

Family Talitridae
Hyalella azteca (Saussure)

Family Ampithoidae
Cymadusa compta (Smith)

Family Xanithdae
Panopeus herbstii (Milne-Edwards)

Family Aoridae
Grandidierella sp.

Family Mytilidae
Modiolus demissus (Dillwyn) - Atlantic ribbed mussel

*Taxonomy unstable and difficult; many species present but difficult to further identify.

Source: Thomas, 1976.

TABLE C-4

BENTHOS COLLECTED FROM THE SALT MARSH WATERS

Phylum Nematoda
Subclass Copepoda*
Subclass Ostracoda*

Family Xanthidae
Menpippe mercenaria (Say) - Stone crab
Panopeus herbstii (Milne-Edwards)

Family Diogenidae
Clibanarius vittatus (Bosc)

Family Nuricidae
Thais haemostoma (landmark) - Oyster drill

Family Naticidae
Polinices duplicatus (Say) - Atlantic moon snail

Family Ostreidae
Crassostrea virginica (Gemlin) - Eastern oyster

Family Littorinidae
Littorina irrorata (Say) - Marsh periwinkle

Family Mytilidae
Modiolus demisus (Dillwyn) - Atlantic ribbed mussel

Family Veneridae
Mercenaria mercenaria (Linnaeus) - Northern quahog

Family Squillidae
Squilla sp.

Family Gammaridae
Gammarus mucronatus (Say)

Family Ampeliscidae
Ampelisca sp.

Family Corophidae
Cerapus tubularis (Say)
Corophium sp.

Family Talitridae
Hyalella azteca (Saussure)

Table C-4 continued.

Family Ampithoide
  Cymadusa compta (Smith)

*Taxonomy unstable and difficult; many species present but difficult to further identify.

Source: Thomas, 1976.

TABLE C-5

ZOOPLANKTON IDENTIFIED ON THE TRANSECT FROM
LOUISIANA COASTAL WATERS TO THE BACK SWAMP FOR LOOP STUDY

Station	Near Shore** 1-1 and 1-2	Salt Marsh** 1-4 and 3-2	Salt Marsh** 6	Brackish** Marsh 7	Fresh Marsh 8 and 12	Back Swamp 10	Impounded** Area 3A	Leeville** Oilfield 5
Classification								
Phylum: Protozoa								
Order: Dinoflagellida	*							
Phylum: Coelenterata							L	
Class: Hydrozoa	*L				L	L		
Phylum: Ctenophora	*L	L	L	L	L	L		L
Phylum: Rotifera	*L	L	L	L	L	L	L	L
Phylum: Nematoda		L					L	
Phylum: Mollusca								
Class: Pelecypoda						L		
Larvae	*							
Order: Nudibranchia							L	
Class: Gastropoda							L	
Order: Basommatophora								
Laevapex sp.					L	L		
Physa sp.						L		
Order: Pterpoda	*							
Phylum: Annelida								
Class: Polychaeta	L	L	L	L				L
Nereis succinea					L	L		
Class: Hirudinea					L	L		
Class: Oligochaeta								

Table C-5 continued.

Station	Near Shore** 1-1 and 1-2	Salt Marsh** 1-4 and 3-2		Brackish** Marsh 7	Fresh Marsh 8 and 12	Back Swamp 10	Impounded** Area 3A	Leeville** Oilfield 5
		1-4 and 3-2	6					
Phylum: Arthopoda								
Class: Crustacea								
Subclass: Branchiopoda								
Order: Diplostraca								
Suborder: Cladocera		L					L	
<u>Alona</u> spp.				L	L	L		
<u>Bosmina longirostris</u>					L	L		
<u>Ceiodaphnia lacustris</u>						L		
<u>C. laticaudata</u>					L	L		
<u>C. reticulata</u>						L		
<u>C. rigaudi</u>					L	L		
<u>Pseudochydorus globosus</u>					L	L		
<u>Chydorus spaericus</u>					L	L		
<u>Dadaya macrops</u>						L		
<u>Daphnia ambiqua</u>						L		
<u>D. laevis</u>						L		
<u>D. parvula</u>					L	L		
<u>Diaphanosoma branchyurum</u>				L	L			
<u>Eubosmina tubocin</u>						L		
<u>D. luchtenberqianum</u>					L	L		
<u>Euryalona occidentalis</u>					L	L		
<u>Evadne tergentina</u>	*							
<u>Ilyocryptus spinifer</u>					L	L		
<u>I. sordidus</u>					L			
<u>Kurzia latissima</u>					L	L		
<u>Latinopsis fasiculata</u>					L			
<u>L. occidentalis</u>					L			
<u>Leydigia acanthoceroides</u>				L	L			
<u>L. quadrangularis</u>						L		

Table C-5 continued.

Station	Near Shore** 1-1 and 1-2	Salt Marsh** 1-4 and 3-2	Salt Marsh** 6	Brackish** Marsh 7	Fresh Marsh 8 and 12	Back Swamp 10	Impounded** Area 3A	Leeville** Oilfield 5
Macrothrix laticornis					L			
Moina micrura					L			
Moinodaphnia macleavii					L	L		
M. sp.					L	L		
Penilia avirostris	*							
Podon polyphemoides	*							
Scaphelebris kingi					L	L		
Simocephalas expinosus					L	L		
S. vetulus					L			
Macrothrix rosea					L			
Subclass: Ostracoda	*L	L	L	L	L	L	L	L
Subclass: Copepoda								
Order: Calanoida								
Acartia tonsa	*L	L	L	L	L		L	L
A. spinata	*	L					L	
A. danae	*							
Candacia bipinnata	*							
Centropages hamatus	*			L				
C. furcatus	*							
Diaptomus dorsalis					L	L		
D. reighardi					L	L		
D. siciloides					L			
Eucalanus pileatus	*							
E. sp.	*							
Euchaeta marine	*							
Eurytemora hirundoides	*							
E. affins					L			
Labidocera aestiva	*							L
L. sp.	*L							
Mormonilla sp.	*							

Table C-5 continued.

Station	Near Shore** 1-1 and 1-2	Salt Marsh** 1-4 and 3-2	Salt Marsh** 6	Brackish** Marsh 7	Fresh Marsh 8 and 12	Back Swamp 10	Impounded** Area 3A	Leeville** Oilfield 5
Osphranticum labronectum				L	L			
Paracalanus sp.	*L	L					L	
P. crassirostris								
Pontella sp.	*							
Pontellopsis sp.	*							
Pseudodiaptomus coronatus		L					L	
Rhinealanus cornutus	*							
Temora turbinata	*							
T. stylifera	*							
Tortanus sp.	*							
T. setacaudatus			L					L
Undinula vulgaris	*							
Order: Cyclopoida								
Clytemnestra scutellata	*							
Copilia matabilis	*							
Corycaecus sp.	*							
Cyclops nearcticus					L			
C. panamensis				L	L			
C. rubellus					L	L		
C. thomasi						L		
C. vernalis		L			L	L		
Ectocyclops phaleratus					L	L		
Eucyclops agilis					L	L		
E. speratus					L	L		
E. sp.		L						
Halicyclops fosteri	*							
H. sp.				L				
Macrocyclops albidus					L	L		
M. ater					L	L		
Mesocyclops edax					L	L		
M. inversus					L	L		

Table C-5 continued.

Station	Near Shore** 1-1 and 1-2	Salt Marsh** 1-4 and 3-2	Salt Marsh** 6	Brackish** Marsh 7	Fresh Marsh 8 and 12	Back Swamp 10	Impounded** Area 3A	Leeville** Oilfield 5
M. longisetus					L			
Oithona sp.	*		L					L
Oncaea mediterranea	*							
O. sp.	*							
O. conifera		L						
Orthocyclops modestus								
Paracyclops poppei								
Saphirella sp.	L	L	L	L	L			L
Sapphrina nigromaculata	*							
S. sp.	*							
Tropocyclops prasinus					L	L		
Order: Harpacticoda		L	1	1	1	1		L
Alteutha sp.	*							
Euterpina acutifrons	*							
Macrosetel sp.	*L	L					L	
Order: Caligoida								
Caligus sp.	*				L			
Ergasilus sp.			L	L	L	L	L	L
Subclass: Branchiura								
Argulus sp.				L	L			
Subclass: Cirripedia								
Nauplii	L	L	L	L			L	L
Cypris larvae			L					L
Subclass: Malocostraca								
Order: Amphipoda	*		L		L	L	L	
Order: Isopoda	*		L					L
Order: Cumacea	*							
Order: Mysidacea	*	L						
Order: Stomatopoda larvae	*							
Order: Decapoda								
Suborder: Natantia								

Table C-5 continued.

Station	Near Shore** 1-1 and 1-2	Salt Marsh** 1-4 and 3-2	6	Brackish** Marsh 7	Fresh Marsh 8 and 12		Back Swamp 10	Impounded** Area 3A	Leeville** Oilfield 5
Section: Peaeidae			L	L	L	L		L	
Suborder: Reptantia									
Section: Anomura	*								
Section: Anomura, zoeae									
Procambarus clarkii					L	L			
Class: Arachnida				L	L	L		L	
Class: Insecta									
Order: Coleptera larvae				L	L	L			
Order: Diptera, larvae					L	L			
Order: Ephemeroptera nymphs					L	L			
Order: Hemiptera					L				
Order: Odonata, nymphs					L	L			
Phylum: Echinodermata, larvae	*								
Phylum: Chaetognaths									
Sagitta sp.	*L	L					L		
Phylum: Chordata									
Subphylum: Urochordata (tunicates)	*L	L					L		
Subphylum: Vertebrata (fish larvae)	*L	L		L	L	L	L	L	
Total Number Taxa Identified	58	20	17	19	66	62	19	21	

*Taxa identified by Gillespie (1971).
LTaxa identified by LOOP sponsored research.
**Representative of marsh types on project area.

Source: Bouchard and Turner, 1976.

APPENDIX D

WATER QUALITY INPUT FOR PROPOSED SAND DREDGING PROJECTS (LAFOURCHE PARISH WETLANDS)66, 81, AND 139

1. Water Quality of Surface Water.

a. State Water Quality Standard. The Louisiana Stream Control Commission (1977) has published a complete set of water quality standards, "State of Louisiana Water Quality Criteria," for the purpose of protecting all state waters for recreational uses in and/or on the water, and for the preservation and propagation of desirable species of aquatic biota such as indigenous species of fish, shellfish, and wildlife. The use and value of water for public water supplies, agricultural, industrial, and other purposes, as well as navigation, were considered in setting standards, but, with few exceptions, the criteria supporting these users are not permitted to interfere with recreational uses, and the preservation of desirable species of aquatic biota. State water quality standards applicable to Barataria Bay (including Caminada, Creole, and Hackberry Bays, and Bay Batiste and Bay Long) are listed below:

(1) Water Uses: Primary Contact Recreation; Secondary Contact Recreation; Propagation of Fish and Wildlife

(2) Dissolved Oxygen: No less than 4.0 mg/l.

(3) pH: 6.5 to 9.0

(4) Bacteria Standard: Standard No. 4. SHELLFISH PROPAGATION - The monthly total coliform median MPN (most probable number) shall not exceed 70 per 100 ml, and not more than 10 percent of the samples ordinarily exceed an MPN of 230/100 ml.

(5) Temperature: 35 degree C.

(6) Effluent Limitations. The Louisiana Stream Control Commission (1979), at a public hearing held 25 January 1979, after appropriate public participation and acting under the authority of provisions of Section 1435 and 1439 of Title 56, chapter 3, part 1, of Louisiana Revised Statutes of 1950, as amended, promulgated the following rule relative to effluent limitations on process generated wastewater and mine dewatering discharges associated with extraction of sand and/or gravel, including "pit run" operations, from natural deposits in the State of Louisiana:

I. All such discharges shall not exceed the following limitation:

A. Total suspended solids, mg/l: twenty-five and forty-five daily average maximum, respectively. (Certain operations on the Mississippi River may be granted a variance.)

B. pH, standard units: Not less than 6.0 nor greater than 9.0.

C. Turbidity, nephelometric or formazin turbidity units:

1. Fifteen and twenty-five daily average and maximum, respectively, for Scenic Streams and their tributaries.

2. Twenty-five daily maximum for primary contact recreation water bodies.

3. For other water use classifications, with the exception of cases where numerical turbidity effluent limitations may be imposed to preserve downstream usages, the general criteria contained in the existing State of Louisiana Water Quality Criteria shall apply.

D. Oil and grease, mg/l: Fifteen daily maximum where applicable.

II. Any overflow from facilities governed by this rule shall not be subject to the preceding effluent limitations if the facilities are designed, constructed, and maintained to contain or treat the volume of wastewater which would result from a 10-year 24-hour precipitation event.

III. Any overflow from facilities governed by this rule shall not be subject to the preceding effluent limitations if the facilities are designed, contructed, and maintained to avert inundation which would result from a Q_5 stream flow (defined below).

IV. In the case of a discharge into receiving waters for which the pH, if unaltered by man's activities, is or would be less than 6.0 and water quality criteria in water quality standards approved under the Act (Public Law 92-500) authorize such lower pH, the pH limitations for such discharge criterion for the receiving waters. In no case shall a pH limitation outside the range 5.0 to 9.0 be permitted.

V. Analytical procedures shall conform to the latest edition of Standard Methods for the Examination of Water and Wastewater, published jointly by the American Public Health Association, American Water Works Association, and the Water Pollution Control Federation. Tests may also be in accordance with other acceptable methods which have proven to yield reliable data and meet with the approval of the Louisiana Stream Control Commission.

VI. Specialized definitions:

A. The term "mine dewatering" shall mean any water that is impounded or that collects in the mine and is pumped, drained, or otherwise removed from the mine through the efforts of the mine operator. This term shall also include wet pit overflows caused solely by direct rainfall and ground water seepage. However, if a mine is also used for treatment of process generated wastewater, discharges of commingled water from the mine shall be deemed discharged of process generated wastewater.

B. The term "10-year 24-hour precipitation event" shall mean the maximum 24-hour precipitation event with a probable reoccurrence interval of once in 10 years. This information is available in "Weather Bureau Technical Paper No. 40," May 1961 and "NOAA Atlas 2," 1978 for the 11 western states, and may be obtained from the National limatic Center of the Environmental Data Service, National Oceanic and Atmospheric Administration, United States Department of Commerce.

C. The term "mine" shall mean an area of land, surface or underground, actively mined for the production of sand and gravel from natural deposits.

D. The term "process generated wastewater" shall mean any wastewater used in the slurry transport of mined material, air emissions control, or processing exclusive of mining. The term shall also include any other lagoon, mine, or other facility used for treatment of such wastewater. The term does not include wastewater used for the suction dredging of deposits in a body of water and returned directly to the body of water without being used for other purposes or combined with other wastewater.

E. The term "Q_5" stream flow" shall mean the stream flow or discharge expected to be equaled or exceeded on the average of once each 5 years. This information (or an acceptable estimate for a particular location on a stream) may be obtained from the Geological Survey, United States Department of the Interior.

F. The "daily average" concentration means the arithmetic average (weighted by flow value) of all the daily determinations of concentrations made using a composite sample shall be the concentration of the composite sample. When grab samples are used, the daily determination of concentration shall be arithmetic average (weighted by flow value) of all the samples collected during that calendar day.

G. The "daily maximum" concentration means the daily determination of concentration for any calendar day.

b. Federal Water Quality Criteria. The only existing Federal water quality criteria have been listed by the US Environmental Protection Agency. These criteria are listed in Table D-1.

c. Water Quality of Surface Waters At Sites of the Proposed Projects. A series of water and sediment chemical analyses were conducted in September 1974 in the chenier area east of the proposed Plaisance site, east of the proposed Picciola site (Ho and Blanchard, 1976). Temperature and salinity studies were also made in the same area in August and September 1974 (Loesch, 1976). In order to comply with recommendations by the US Army Corps of Engineers, New Orleans District, with regard to analysis of water quality and chemical analysis of sediments which would be involved in dredging activities, the applicants hired consultants to collect and analyze water and sediment samples from the respective proposed sites. The results of all of these studies are discussed in this section.

(1) Water and Sediment Chemistry in September 1974. Ho and Blanchard (1976) took samples of sediments, their interstitial water, and the associated water column in September, 1974, at six stations in the chenier area of the proposed Plaisance site, east of the proposed Picciola site (Figure D-1). These samples were analyzed for several chemical characteristics and the results of these analyses are presented in Tables D-2 - D-5 and summarized in Table D-6. The following brief discussion of the results is from the Louisiana Offshore Oil Port, Environmental Baseline Study, Volume IV, Addenda to Technical Appendices.

Sediment samples at stations 1, 2, and 3 were sandy, low in organic matter and contained very little fine clay; stations 4, 5, and 6 contained much higher amounts of organic matter (Table D-2). The moisture content of sediments from Stations 1, 2, and 3 was very low, whereas that for sediments from Stations 4, 5, and 6 was high, producing a surface sediment that was soupy in consistency. Sulfide content at Stations 1, 2, and 3 was low compared to that at Stations 4, 5, and 6; samples from Station 4 contained the highest FeS. The BOD value at all six stations ranged from 2.1 to 3.9 and no significant trend was apparent (Table D-2)

Trace metals (Table D-3) were generally lower in the sediments taken from the sandy areas (Stations 1, 2, and 3) than in sediments taken from organic-rich stations (Stations 4, 5, and 6). The trace metal concentrations in the sediments from all six stations were within the natural background levels, indicating that the area is relatively free of man's influence.

The composition of interstitial water is presented in Table D-4. In spite of the sandy nature of the sediments from stations 1, 2, and 3, NH_4-N, dissolved organic-N, amino acid-N, and dissolved SiO_2 were rather high and were more similar in magnitude to the values obtained in the organic-rich area (Stations 4, 5, and, 6). NH_4-N varied from 3.1 to 6.8 mg/l; $(NO_3 + NO_2)$-N constituted less than 30 percent of the total inorganic-N. Amino acid-N constituted the

TABLE D-1

MARINE WATER PARAMETER LIMITS

Dissolved Oxygen	4.0 mg/l min. LSCC
Mercury	.0001 mg/l max. EPA*
Lead	0.025 mg/l max. EPA*
Arsenic	0.508 mg/l max. EPA*
Cadmium	0.0045 mg/l max. EPA*
Copper	0.0040 mg/l max. EPA*
Chromium	0.018 mg/l max. EPA*
Nickel	0.0071 mg/l max. EPA*
Zinc	0.058 mg/l max. EPA*

*EPA (1980) Protection of Marine Life

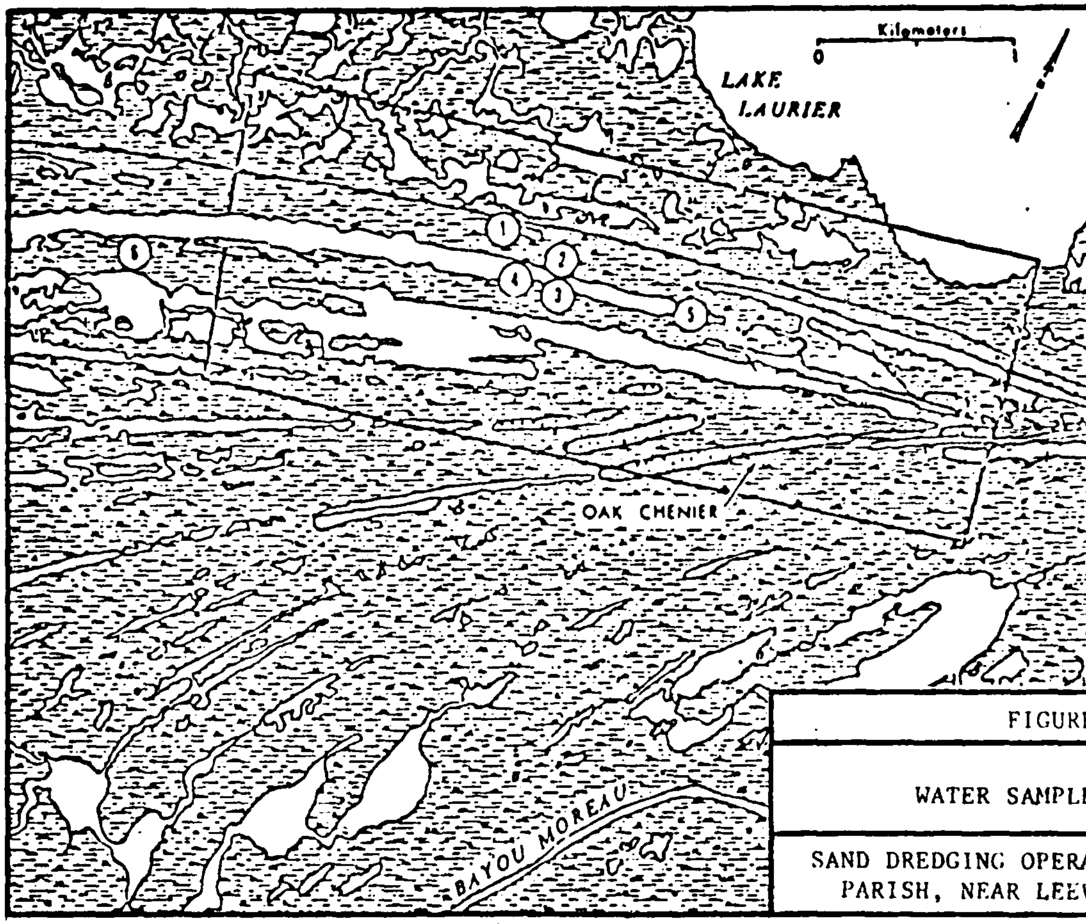


FIGURE D-1

WATER SAMPLE LOCATIONS

SAND DREDGING OPERATIONS IN LAFOURCHE PARISH, NEAR LEEVILLE, LOUISIANA

SOURCE: HO AND BLANCHARD, 1974.

TABLE D-2

SEDIMENT CHEMISTRY AT PLAISANCE (STA. 1-6) SITE (SEPTEMBER 20, 1974)

Station	Type of Environment	Organic-N (Percent)	Organic-C (Percent)	C/N	Moisture (Percent)	Sulfides (as FeS) (mg/100 g) (dry wt)	BOD (mg/1 (mud)
1	salt marsh	0.07	1.12	17.7	40.0	0	2.1
2	salt marsh	0.08	1.1	14.2	43.1	64.7	2.6
3	salt marsh	0.08	1.6	19.6	47.7	69.5	3.9
4	salt marsh	0.26	8.9	34.0	85.2	621.4	3.1
5	salt marsh	0.34	11.7	34.2	85.8	258.4	Sample was Frozen
6	salt marsh	0.44	12.5	28.2	85.0	47.9	3.6

*Unknown substance interfered with determination.

Source: Ho and Blanchard, 1974.

TABLE D-3

HEAVY METALS IN SEDIMENTS AT PLAISANCE (STA. 1-6) SITE (20 SEPTEMBER 1974)

			(mg/100 g dry wt)						
Station	Type of Environment	Fe (%)	Mn	Pb	Ni	Cu	Zn	V	Hg (mg/100 g dry weight)
1	salt marsh	0.47	7.50	0.36	4.16	0.31	2.89	0.44	28.66
2	salt marsh	0.80	16.80	0.63	1.08	0.69	2.97	0.44	6.46
3	salt marsh	0.79	17.19	0.47	0.89	0.28	3.13	0.51	6.94
4	salt marsh	1.49	42.92	1.36	1.92	2.63	10.10	1.25	25.94
5	salt marsh	1.51	23.65	1.33	1.58	0.98	7.71	1.18	2.21
6	salt marsh	0.85	47.20	1.21	1.16	2.01	4.63	0.86	23.58

Source: Ho and Blanchard, 1974.

TABLE D-4

INTERSTITIAL WATER CHEMISTRY AT PLAISANCE (STA. 1-6) SITE (20 SEPTEMBER 1974)

Station	Type of Environment	(mg/liter) NH_4^+-N	Amino (NO_3^-+NO_2^-)-N	Org-N	Acid-N	Unknown-N	Dissolved SiO_2	PO_4^{-3}-P	Org-P
1	salt marsh	3.94	0.48	14.65	12.25	1.40	10.37	0.74	0.21
2	salt marsh	6.79	2.47	16.76	13.37	3.39	16.36	3.17	0.52
3	salt marsh	3.84	0.35	17.22	13.27	3.96	9.91	0.77	1.94
4	salt marsh	5.93	0.29	24.58	15.63	8.94	15.55	6.45	0.34
5	salt marsh	3.77	0.63	18.00	8.88	9.12	8.40	0.99	2.70
6	salt marsh	3.08	0.70	24.01	14.73	9.28	3.28	0.63	0.49

Source: Ho and Blanchard, 1974.

TABLE D-5

WATER COLUMN CHEMISTRY AT PLAISANCE (STA. 1-6) SITE (20 SEPTEMBER 1974)

		(mg/liter)								
Salinity	Type of Environment	NH_4^+-N	$(NO_3^-+NO_2^-)$-N	Org-N	PO_4^{-3}-P	Org-P	Dissolved SiO_2	DO	BOD	Salinity (ppt)
1	salt marsh	0.15	0.01	0.04	0.21	0.01	5.20	9.03	3.1	23.8
2	salt marsh	0.07	0.13	0.30	0.33	0.05	7.24	11.48	8.6	25.6
3	salt marsh	0.06	0.02	0.30	0.22	0.04	5.45	9.29	6.7	25.5
4	salt marsh	0.03	0.00	0.48	0.03	0.04	1.64	9.80	7.5	24.2
5	salt marsh	0.02	0.13	0.37	0.09	0.08	2.71	10.84	5.7	24.8
6	salt marsh	0.06	0.04	0.28	0.04	0.10	2.14	12.13	9.3	25.8

Source: Ho and Blanchard, 1974.

TABLE D-6

Average Values for Sediment and Water Chemistry at a Site Adjacent to the Proposed Project Area September 1974

Parameter	Sediment	Interstitial Water	Water Column
Organic - C (%)	6.17	--	--
Organic - N (%)	0.21	--	--
C/N	24.6	--	--
Moisture	64.5	--	--
Sulfides, as FeS (mg/100g dry wt.)	176.9	--	--
Biochemical oxygen demand (mg/l)	3.06	--	6.82
Organic - N (mg/l)	--	19.20	0.30
Ammonia - N (mg/l)	--	4.56	0.06
Nitrate - N and Nitrate - N (mg/l)	--	0.82	0.07
x - Amino acid - N (mg/l)	--	13.18	--
Unknown - N (mg/l)	--	6.01	--
Phosphate - P (mg/l)	--	2.13	0.15
Organic - P (mg/l)	--	1.03	0.05
Dissolved SiO_2 (mg/l)	--	10.64	4.07
Dissolved Oxygen (mg/l)	--	--	10.43
Heavy metals (mg/100g dry wt.)			
Manganese	25.68	--	--
Lead	0.89	--	--
Nickel	1.80	--	--
Copper	1.15	--	--
Zinc	5.24	--	--
Vanadium	0.78	--	--
Mercury (ug/100g dry wt.)	15.63	--	--
Iron (%, dry wt.)	1.00	--	--

dominant fraction of the total dissolved organic -N. The high level of free amino acid-N particularly in the samples from the sandy areas (Stations 1, 2, and 3) may be indicative of a high level of biological activity in these areas.

Under normal marine conditions, dissolved SiO_2 generally shows an inverse relationship with salinity (Bein et al., 1958). The high concentrations of SiO_2 in the interstitial water at Stations 1, 2, 3, 4, and 5 (Table D-4) at a high salinity level of 24 to 26 ppt may be due to the stabilizing effect of abundant organic molecules which may prevent soluble SiO_2 from precipitating at high salinity levels.

The highest value for PO_4^{-3} content in the interstitial water samples was at Station 4 (Table D-4).

The results of the chemical analysis of the overlying water column at the six sampling stations are given in Table D-5. It is interesting to note that concentrations for NH_4-N, PO_4, and dissolved SiO_2 were significantly higher at Stations 1, 2, and 3 compared to Stations 4, 5, and 6 even though the salinity level at these stations was about the same. Since Stations 1, 2, and 3 were in narrow channels surrounded by Spartina marsh grass, it is possible that these nutrients were derived from the edge of the marsh where active decomposition and release of nutrients takes place.

(2) Water and Sediment Chemistry at the Proposed Picciola Site in May, 1978.

( ) Methodology. Water and soil samples were collected on 26 May 1978, at the site of the proposed project. Three sampling stations were utilized, two within the proposed Picciola project area and one without, to the southeast. Water sampling consisted of one-gallon grab samples, while soil sampling was accomplished by taking 3-inch diameter core samples to a depth of 2 feet. Both the sampling and analytical work were performed by Ronald H. Kilgen, Ph.D., Fisheries Scientist and Environmental Consultant, and his associates. Sampling, sample preservation, and analyses were performed as recommended by the US Environmental Protection Agency (Methods for Chemical Analysis of Water and Wastes, 1974; Chemistry Laboratory Manual, Bottom Sediments, 1969); the American Public Health Association (Standard Methods for the Examination of Water and Wastewater, 1976); the American Society for Testing and Materials (Annual Book of ASTM Standards, Part 31. Water. 1974); and the Department of the Army, Office of the Chief of Engineers (Elutriate Test Implementation Guidelines, Ocean Dumping Criteria for Dredged Material, Engineering Regulations No. 1130-2-408, 17 January 1974). The concentration of metals was determined using the Perkin-Elmer Model 306 double beam spectrophotometer with deuterium background corrector and with the HGS-2100 graphite furnace. Lower detection limits are parts per billion. Mercury was determined using the cold vapor technique. Pesticide analysis followed the processes outlined in Methods for Organic Pesticides in Water and Wastewater (Environmental Protection Agency, National Environmental Research Center, Cincinnati, Ohio), using Perkin-Elmer GLC and ED detector. Florisil and saponification clean-up procedures were employed. Minimum detection limits are parts per billion.

(b) Results (Table D-7).

1 Dissolved Oxygen. The dissolved oxygen concentration in a body of water influences the metabolism of aquatic organisms and the decomposition of organic materials. Dissolved oxygen concentrations measured on 26 May 1978 were all above the 4.0 mg/l standard set be the Louisiana Stream Control Commission.

2 Salinity. Since the proposed project site is subjected to tidal fluctuations, the salinity concentrations may fluctuate from hour to hour. Salinity is a measure of dissolved solids in water, mainly sodium and chloride ions. Salinities measured on 26 May 1978 averaged 15.5 ppt, which was similar to the values determined by Loesch (1976).

3 Turbidity. Turbidity is a measure of the degree to which suspended and colloidal matter in the water column reduces clearness and limits penetration of light. The turbidities encountered at the project site are quite low (30 NTU, average). Wallen (1951) made a comprehensive study of the effects of turbidity produced from montmorillonite clay with respect to 16 species of fishes, and observed that harmful effects occurred as the turbidity approached 20,000 units.

4 Chemical Oxygen Demand (COD). This analysis determines the quantity of oxygen required to oxidize the organic matter in a water or mud sample, under specific conditions of oxidizing agent, temperature, and time. Average COD values for natural water (1,345 mg/l), filtered water (1,200 mg/l), and standard elutriates (1,375 mg/l) on May 1978 were fairly high.

5 Total Kjeldahl Nitrogen (TKN). The laboratory analysis for TKN determines the sum of free ammonia and organic nitrogen compounds in the samples. On 26 May 1978, TKN values for both natural waters and standard elutriates averaged about 1.50 mg/l.

6 Biochemical Oxygen Demand (BOD). BOD is a measure of the amount of oxygen necessary to satisfy the biochemical oxidation requirements of pollutants at the time the sample is collected, and involves the incubation of the treated samples for 5 days at 20°C. Average BOD values for natural waters and standard elutriates on 26 May 1978 were low (3.0 mg/l and 13.5 mg/l, respectively), while sediment samples had a relatively high BOD (3,459 mg/kg-dry).

7 Total Coliform Bacteria. This includes all of the aerobic and facultative anaerobic gramnegative, non-sporeforming rod shaped bacteria that ferment lactose broth with gas formation within 48 hours at 35°C. The amount present in a water sample is usually expressed as MPN (most probable number). Water samples collected from the project site on 26 May 1978 exceeded Louisiana Stream Control Commission standards, but were not extremely high (average of 132 MPN/100 ml).

TABLE D-7

SUMMARY OF WATER QUALITY DATA FOR SURFACE WATERS AND SEDIMENTS, SITE OF PROPOSED SAND DREDGING OPERATIONS NEAR LEEVILLE, LOUISIANA (1978)

Parameter	Concentration			
	Sta. 1	Sta. 2	Sta. 3	Mean
Dissolved Oxygen (mg/l)				
N	-	12.0	6.8	9.4
Salinity (ppt)				
N	-	8.0	23.0	15.5
Turbidity (NTU)				
N	-	28	32	30
Chemical Oxygen Demand (mg/l)				
N		1,400	1,290	1,345
F		1,200	1,200	1,200
SE		1,500	1,250	1,375
Total Kjeldahl Nitrogen (mg/l)				
N		1.56	1.33	1.44
SE		1.69	1.38	1.54
Biochemical Oxygen Demand (mg/l)				
N		3	3	3
SE		12	15	13.5
S (mg/kg-dry)	1,269	1,857	7,250	3,459
Total Coliforms				
N (MPN/100 ml)	240		23	132
S (MPN/g-wet)	49		49	49
Heavy Metals (mg/l)				
Mercury				
F			0.118	
SE			0.131	
Lead				
F			0.097	
SE			0.111	

Table D-7 continued.

Parameter	Concentration Sta. 1	Sta. 2	Sta. 3	Mean
Heavy Metals (mg/l) (Continued)				
Arsenic				
F			0.012	
SE			0.013	
Cadmium				
F			0.021	
SE			0.021	
Copper				
F			0.014	
SE			0.017	
Chromium				
F			0.113	
SE			0.121	
Nickel				
F			0.011	
SE			0.012	
Zinc				
F			0.041	
SE			0.043	

Pesticides

Aldrin, Cholodane, DDD, DDE, DDT, Dieldrin, Endrin, Ethion, Heptachlor, Heptachlor epoxide, Lindane, Malathion, PCB, Toxaphene

Samples of natural water and standard elutriates from Station 3 were analyzed for these pesticides. None were detected, using methods which would detect a little as one part per billion (1 ppb).

NOTE: N = Natural water
F = Filtered water (0.45-u)
SE = Standard elutriate
S = Sediment

8 Heavy Metals.

a Mercury. Mercuric salts are used in medicines, photoengraving, disinfectants, and pigments. Although mercuric ions are considered to be highly toxic to aquatic life, elemental mercury is insoluble in water. Both the filtered water samples (0.118 mg/l) and standard elutriates (0.131 mg/l) exceeded EPA marine water limits of 0.0001 mg/l. The concentrations found at the site have been reported as being harmful to freshwater fishes (Doudoroff, 1957), but Schweiger (1961) reported that 0.2 mg/l of mercury was not harmful to several fishes, or to fish-food organisms such as crustacea, worms, and insect larvae. Calabrese, et al. (1973) showed that mercuric chloride was toxic to embryos of *Crassostrea virginica* (American oyster), with an LC_{50} of 0.0056 ppm.

b Lead. Lead concentrations of filtered waters (0.097 mg/l) and standard elutriates (0.111 mg/l) exceeded EPA limits for marine waters of 0.050 mg/l. McKee and Wolf (1963) list several reports which indicate that toxicity of lead to fish may range from 75 mg/l to 0.1 mg/l.

c Arsenic. Although elemental arsenic may occur to a small extent in nature, it usually occurs as the arsenides of true metals or as pyrites. It is used in industry for pesticides and wood perservatives. Concentrations found in both filtered water and standards elutriates were below the EPA limits for marine water 0.050 mg/l.

d Cadmium. Elemental cadmium is insoluble in water. It usually occurs as cadimum sulfide, and is sometimes used in insecticides and antihelminthics. McKee and Wolf (1963) list reports which indicate lethal concentrations ranging from 0.01 to about 10 mg/l, depending upon the aquatic species. Filtered water and standard elutriate samples of 26 May 1978 were 0.021 mg/l, exceeding EPA limits of 0.0045 mg/l for marine waters.

e Copper. Elemental copper is insoluble in water, but many copper salts are highly soluble. Copper salts are used in textile processes, paints, insecticides, and fungicides. Copper concentrations in filtered water and standard elutriates of 26 May 1978 were above EPA limits of 0.004 mg/l for marine waters.

f Chromium. Chromium salts are used in metal plating, paints, dyes, explosives, and paper. The toxicity of chromium salts varies widely with the aquatic species, and with many variables. Both the filtered water (0.113 mg/l) and the standard elutriate (0.121 mg/l) exceeded EPA limits for marine waters (0.018 mg/l) on 26 May 1978.

g Nickel. Although elemental nickel is insoluble in water, salts are highly soluble. Filtered water and standard elutriates on 26 May 1978 were above EPA limits of 0.007 mg/l for marine waters.

h Zinc. Zinc is used in galvanizing, paint, insecticides, and many other uses. Filtered water and standard elutriates on 26 May 1978 were below EPA limits of 0.058 mg/l for marine waters.

9 Pesticides. Natural water samples and standard elutriates from 26 May 1978 were analyzed for 14 pesticides, including aldrin, chlordane, DDD, DDE, DDT, dieldrin, endrin, ethion, heptachlor, heptachlor, epoxide, lindane, malathion, PCB, and toxaphene. Most of these are persistent chlorinated hydrocarbons. No trace of any of these was found at the parts per billion level.

(3) Water and Sediment Chemistry at the Proposed Plaisance Site in March, 1979.

(a) Methodology. Water and soil samples were collected on 15 March 1979 at the site of the proposed project. Five sampling stations were utilized as follows: S-1 - Ridge Edge (Sediment); S-2 - Proposed Pit #1 (Sediment); S-3 - Proposed Pit #2 (Sediment); W-1 - Existing Pit (Water); and W-2 - Plaisance Canal (Water). All sampling, sample preservation, and analytical work were performed by Southern Petroleum Laboratories, Inc., personnel. Sampling, sample preservation, and analyses were performed as recommended by the US Environmental Protection Agency (Methods for Chemical Analysis of Water and Wastes, 1974); the American Public Health Association (Standard Methods for the Examination of Water and Wastewater, 1976); and the American Society for Testing and Materials (Annual Book of ASTM Standards, Part 31. Water, 1974). Elutriate samples were prepared by mixing a sample of the sediment involved with the surface water from the dredging site in a 1:4 volume/volume mixture.

(b) Results (Tables D-8 - D-10).

1 Dissolved Oxygen. Dissolved oxygen concentrations measured on 15 March 1979 were all above 4.0 mg/l standard set by the Louisiana Stream Control Commission.

2 Salinity. Because the proposed project site is subject to tidal fluctuations, the salinity concentrations may fluctuate from hour to hour. Salinities measured on 15 March 1979 averaged 14.7 ppt which is similar to the values determined by Loesch (1976).

3 Turbidity. The average turbidity at the proposed project site on 15 March 1979 was 25 NTU.

4 Chemical Oxygen Demand (COD). Average COD values at the proposed project site on 15 March 1979 were 1430 mg/l for natural water 1196 mg/l for filtered water, and 2428 mg/l for standard elutriates.

5 Total Kjeldahl Nitrogen (TKN). On 15 March 1979, TKN values for natural waters averaged 1.0 mg/l at the proposed project site. TKN values for standard elutriates averaged 0.653 mg/l.

TABLE D-8

SUMMARY OF WATER QUALITY DATA FOR SURFACE WATER SAMPLES, SITE OF PROPOSED SAND DREDGING OPERATIONS NEAR LEEVILLE, LOUISIANA (1979)

Parameter	W-1 (Natural)	W-1 (Filtered)	W-2 (Natural)	W-2 (Filtered)
Dissolved Oxygen	9.8 ppm		9.6 ppm	
Salinity	12.5 ppt		16.8 ppt	
Turbidity	25 units		25 units	
Chemical Oxygen Demand	775 mg/1	728 mg/1	2,085 mg/1	1,664 mg/1
Total Kjeldahl Nitrogen	1.0 mg/1		1.0 mg/1	
Biochemical Oxygen Demand	14 mg/1		5 mg/1	
Total Coliforms	10/100 ml		28,000/100 ml	
Mecury		<0.005 mg/1		<0.005 mg/1
Lead		<0.1 mg/1		<0.1 mg/1
Arsenic		<0.02 mg/1		<0.02 mg/1
Cadmium		<0.05 mg/1		<0.05 mg/1
Copper		0.035 mg/1		0.041 mg/1
Chromium		0.037 mg/1		0.048 mg/1
Nickel		<0.05 mg/1		<0.05 mg/1
Zinc		0.043 mg/1		0.042 mg/1

TABLE D-9

LEVELS OF PESTICIDES IN ELUTRIATES FROM SITE OF PROPOSED SAND DREDGING OPERATIONS NEAR LEEVILLE, LOUISIANA (1979)

	#1	#2	#3	W-1 (Natural)	W-2 (Natural)
Aldrin	<1 ppb	<1 ppb	<1 ppb	<1 ppb	<1 ppb
Chlordane	<1 ppb	<1 ppb	<1 ppb	<1 ppb	<1 ppb
DDD	<1 ppb	<1 ppb	<1 ppb	<1 ppb	<1 ppb
DDE	<1 ppb	<1 ppb	<1 ppb	<1 ppb	<1 ppb
DDT	1 ppb	<1 ppb	<1 ppb	<1 ppb	<1 ppb
Dieldrin	1 ppb	<1 ppb	<1 ppb	<1 ppb	<1 ppb
Endrin	<1 ppb	<1 ppb	<1 ppb	<1 ppb	<1 ppb
Ethion	<1 ppb	<1 ppb	<1 ppb	<1 ppb	<1 ppb
Heptachlor	<1 ppb	<1 ppb	<1 ppb	<1 ppb	<1 ppb
Heptachlor Epoxide	<1 ppb	<1 ppb	<1 ppb	<1 ppb	<1 ppb
Lindane	<1 ppb	<1 ppb	<1 ppb	<1 ppb	<1 ppb
Malathion	<1 ppb	<1 ppb	<1 ppb	<1 ppb	<1 ppb
PCB	<1 ppb	<1 ppb	<1 ppb	<1 ppb	<1 ppb
Toxaphene	<1 ppb	<1 ppb	<1 ppb	<1 ppb	<1 ppb

TABLE D-10

WATER QUALITY DATA FOR SEDIMENT SAMPLES FROM SITE OF PROPOSED SAND DREDGING OPERATIONS NEAR LEEVILLE, LOUISIANA (1979)

	S-1	S-2	S-3
Biochemical Oxygen Demand	2,640 mg/l	900 mg/l	1,440 mg/l
	Elutriate S-1	Elutriate S-2	Elutriate S-3
Chemical Oxygen Demand	1,290 mg/l	1,711 mg/l	4,285 mg/l
Total Kjeldahl Nitrogen	0.56 mg/l	0.28 mg/l	1.12 mg/l
Biochemical Oxygen Demand	19 mg/l	17 mg/l	11 mg/l
Total Coliforms *	<1/100 g	<1/100 g	<1/100 g
Mercury	<0.005 mg/l	<0.005 mg/l	<0.005 mg/l
Lead	<0.005 mg/l	<0.005 mg/l	<0.005 mg/l
Zinc	0.0064 mg/l	0.044 mg/l	0.043 mg/l
Arsenic	<0.02 mg/l	<0.02 mg/l	<0.02 mg/l
Cadmium	<0.05 mg/l	<0.01 mg/l	<0.01 mg/l
Copper	0.033 mg/l	0.044 mg/l	0.037 mg/l
Chromium	0.033 mg/l	0.030 mg/l	0.036 mg/l
Nickel	<0.05 mg/l	<0.05 mg/l	<0.05 mg/l

*Sterile water used for mixing.

6 Biological Oxygen Demand (BOD). Average BOD value for natural water at the proposed project site on 15 March 1979 was 9.5 mg/l. Average BOD value for standard elutriates was 15.67 mg/l.

7 Total Coliform Bacteria. Water samples collected from the proposed project site on 15 March 1979 contained an average 14,0005 $^{MPN}/_{ml}$ total coliform bacteria.

8 Heavy Metals.

a Mercury. The average mercury levels for both the filtered water and standard elutriates from the proposed project site were less than 0.005 mg/l.

b Lead. Lead concentrations in the filtered water samples and for standard elutriates were less than 0.1 mg/l.

c Arsenic. The concentrations for both filtered water and standard elutriates were less than 0.02 mg/l. This value is below the EPA limits for marine waters (0.508 mg/l).

d Cadmium. The concentration of cadmium in the filtered water samples on 15 March 1979 were less than 0.05 mg/l. The concentration for standard elutriates was less than 0.01 mg/l. Both of these values are above EPA limits for marine waters.

e Copper. Copper concentrations in the filtered water samples and for standard elutriates averaged 0.038 mg/l and .033, respectively.

f Chromium. The average concentration of chromium in the filtered water samples was 0.0425 mg/l. The average concentration for standard elutriates was 0.033 mg/l. Both of these values exceeds the EPA limits for marine waters (0.018 mg/l).

g Nickel. Nickel concentrations in the filtered water samples and for standard elutriates were less than 0.05 mg/l.

h Zinc. The filtered water samples had an average concentration of zinc of 0.042 mg/l. The average concentration for standard elutriates was 0.031 mg/l. The values are below the EPA limits for marine waters (0.058 mg/l).

9 Pesticides Table D-9). No trace of any of the pesticides was found at the parts per billion level.

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5-8